REPORT RESUMES

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REORGANIZED SCIENCE CURRICULUM, K, KINDERGARTEN SUPPLEMENT.
MINNEAPOLIS SPECIAL SCHOOL DISTRICT NO. 1, MINN.
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DESCRIPTORS- *CURRICULUM DEVELOPMENT, *ELEMENTARY SCHOOL SCIENCE, *KINDERGARTEN, *TEACHING GUIDES, ASTRONOMY, BIBLIOGRAPHIES, BIOLOGY, CURRICULUM, EARTH SCIENCE, INSTRUCTIONAL MATERIALS, PHYSICAL SCIENCES, SCIENCE EQUIPMENT, SCIENCE MATERIALS, SCIENCE ACTIVITIES, SCIENCE COURSES, MINNEAPOLIS, MINNESOTA,

THIS VOLUME PROVIDES THE KINDERGARTEN TEACHER WITH A GUIDE TO THE REORGANIZED SCIENCE CURRICULUM OF THE MINNEAPOLIS PUBLIC SCHOOLS. THE MATERIALS ARE INTENDED TO BE AUGMENTED AND REVISED AS THE NEED ARISES. A CHART INDICATES CONCEPTS TO BE TAUGHT IN GRADES K-3 FOR EACH OF THE FOUR AREAS AROUND WHICH THE PROGRAM IS DESIGNED. THE AREAS ARE (1) THE EARTH, (2) LIVING THINGS, (3) ENERGY, AND (4) THE UNIVERSE. AT THE PRESENT TIME THE SUPPLEMENT CONTAINS MATERIAL FOR THE EARTH AND THE UNIVERSE. OTHER AREAS WILL BE ADDED AS THEY BECOME AVAILABLE. COURSE CONTENT FOR THE VARIOUS GRADES OF THE ENTIRE K-12 PROGRAM ARE ALSO GIVEN IN CHART FORM. IN ADDITION TO THE INTRODUCTORY MATERIAL, SECTIONS OF THE SUPPLEMENT ARE (1) CONCEPTS, (2) RESOURCE UNITS, (3) ANNOTATED BIBLIOGRAPHY, BOOKS, (4) ANNOTATED BIBLIOGRAPHY, FILMS, AND (5) EQUIPMENT AND SUPPLIES. (DH)

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SCIENTIFIC APPROACH TO PROBLEM SOLVING

1. Observation--first-hand experiences and observation.

2. Definition of PROBLEM--ask questions, choose one for investigation.

3. Results of other investigators--read about problem, discuss it with interested friends and resource people, examine the written material.

4. Possible solutions--list all possible guesses.

5. Choosing the best solution (HYPOTHESIS)--pick the "best guess".

6. Testing the hypothesis--planning and carrying out EXPERIMENTS to determine its truth.

7. CONCLUSION of accepting or rejecting hypothesis--draw conclusion from experiments to determine acceptance or rejection of "best guess".

8. More extensive testing of hypothesis--experiment further to determine if hypothesis always holds true.

9. Stating the THEORY and publishing results--restate the hypothesis in light of the above experimentation, publish in professional journal.

10. Finding mathematical proof--do any measuring and mathematical calculations to develop proof of theory.

11. Statement of LAW or PRINCIPLE--if no one can find a mistake in the mathematical proof or develop a contrary proof, the theory becomes a law or principle.

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THE KINDERGARTEN SUPPLEMENT

to the

REORGANIZED SCIENCE CURRICULUM

Kindergarten Through Grade Twelve

(For Discussion Purposes Only)

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special school district no. 1
Minneapolis, Minnesota

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MINNEAPOLIS PUBLIC SCHOOLS
special school district no. 1
Minneapolis, Minnesota

October 1, 1962

FOREWORD

Long before that famous October fourth, 1957, when Sputnik I rocketed into orbit, the science teachers of the Minneapolis Public Schools eagerly began work on the reorganization of the science curriculum from kindergarten through grade twelve. This reorganized science curriculum was requested by our instructional staff and developed by representative members of that staff.

The citizen of today must be science literate in order to exercise adequately his duties of citizenship. The contribution of the scientist to our way of life is the methods which he uses to attack a problem and seek its solution. These methods are unique, but more important, they are very useful; they can be applied in the solution of the everyday problem by knowledgeable children at all ages and grade levels, and by adults in all walks of life. If these methods of science are to be learned by the youth of Minneapolis, they must be learned by attacking realistic problems inside and outside the classroom. This practice in the solving of work-a-day problems trains our young citizens to think for themselves in seeking new solutions to age-old problems of our civilization.

In the Minneapolis Public Schools we recognize that science is a very important part of the liberal arts general education which should be studied by all students. We are aware of our responsibility for instruction which must be well grounded in the fundamental laws and principles in all the fields of the basic sciences and therefore propose this reorganized curriculum for teaching the ever-expanding knowledge of science.

This reorganized science curriculum does not teach itself. It is a planned developmental approach in which the teacher is the expeditor and not the limiter of learning. The curriculum has been developed to aid the student in acquiring new breadths and new depths of understanding of his environment; and with it a teacher who is well trained in science may lead the student in an ever-expanding investigation of his surroundings in this world and universe. If the curriculum is used cooperatively by teacher and students, it is an instrument which can mold a pupil of the Minneapolis Public Schools into a science-literate citizen who, if he continues advanced science training, may become a scientist of the future.

Rufus A. Putnam
Superintendent of Schools

INTRODUCTION

This Supplement has been prepared as a convenient reference to assist the kindergarten teacher in teaching the science content allocated in the Reorganized Science Curriculum. Kindergarten teachers suggested and assisted with the preparation of each section of this Supplement. Those who have participated in the preparation of this Supplement lay no claim to its being "without blemish". However, its value can be determined only by those classroom teachers who use it and make constructive suggestions to improve it. All Minneapolis Public School personnel are invited to cooperate in improving this Supplement in order to make it of genuine assistance to all beginning and experienced kindergarten teachers. All constructive suggestions should be called in or sent to the Science Department Office.

This Supplement is not complete at the present time. When additional materials are developed, a copy will be furnished to you to place in this loose-leaf binder. Your cooperation with us to keep your Supplement up-to-date will be appreciated. When you leave your school, please leave the Supplement for the next teacher's use.

CONTINUITY OF SUBJECT MATTER, KINDERGARTEN THROUGH GRADE THREE

Introduction to Science

Kindergarten	Grade One	Grade Two	Grade Three
Science and how we learn about it	Some ways of learning science	Using science	Methods of science
			Tools for measurement of time and direction

I. The Earth

Finding out about our earth	Rocks and soil		Features of the earth's crust
			How soils are made
Seeing differences in materials			
Water		Water appears and disappears	Water is everywhere
Air around us	Air around us		Air is everywhere
			What makes the weather?

II. Living Things

Things that are alive			Things alive
			Protecting and enjoying plants and wildlife
Plants around us	Learning about plants	How plants live and grow	How plants depend on their environment
	Kinds of seeds and how they travel		
How animals are different 1. Body covering 2. Movement 3. Habitat 4. Usefulness	Animals need food	Animal behavior	How animals help us
Enjoying animals	Animals use their senses	Animals have young	Animals live in communities
What our bodies need	Our bodies	Understanding ourselves	Our bodies at work

CONTINUITY OF SUBJECT MATTER, KINDERGARTEN THROUGH GRADE THREE

III. Energy

Kindergarten	Grade One	Grade Two	Grade Three
			Liquids and solids
Simple machines		Things that help and hinder work	Mechanical energy
			Earth's gravity
Magnets are fun		Magnets and what they do	
	What we can learn from sound	How sounds travel	
	Electricity works for us		Effects of current electricity
Keeping warm			Sources and uses of heat
How light helps us	Light and shadows	Light and how it is reflected	

IV. The Universe

Kindergarten	Grade One	Grade Two	Grade Three
We look at the sky	Our star, the sun	What we see in the sky	The sun and other stars
	The earth where we live	Movements of the earth	

Minneapolis Public Schools
Science Department
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SUMMARY OF GRADE-CONTENT ASSIGNMENTS

Area and Major Topics	Grade Level												
	K	1	2	3	4	5	6	7	8	9	10	11	12
Introduction to Science (Gray)	*	*	*	+	*	*	*	+	+	+	+	+	+
A. Attitudes (Including history)	+	+	+	+	+	+	+						+
B. Tools	+		+	+	+		+						+
C. Methods	+		+	*	+	+	+						
I. The Earth (Red)	+	+	+	*	*	+		+	*				
A. History of the earth					+				+				
B. Physical features	*	+		+	+				+				
C. Rocks and minerals	+	*			+				+				
D. Soils		+		+	+				+				
E. Water	*		*	+	*			*					
F. Air	+	*		+	*			*					
G. Weather and climate				+		*			*				

Key to symbols -- * major emphasis

+ content to be taught

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Area and Major topics	Grade Level K	1	2	3	4	5	6	7	8	9	10	11	12
II. Living Things (Green)	+	+	+	+	+	+		*			*		
A. Life and life processes	+	+	+	+		*		+			+		
1. Life in general	+			*		+		+			+		
2. Food taking or nutrition		*	*	+		+		+			+		
3. Digestion								+			+		
4. Absorption						+		+			+		
5. Circulation				+		+		+			+		
6. Respiration						+		+			+		
7. Assimilation								+			+		
8. Oxidation						+		+			+		
9. Excretion				+		+		+			+		
10. Reproduction and growth		*	*	*		+		+			+		
11. Responsiveness	+	*	+	+		+		+			+		
B. Classification	*	+	+	+		*		+			+		
C. Ecology	*	+	*	*	*			+			+		
D. Plant and animal economics	+	+	+	*	*			+			+		
E. Human Body	*	*	*	*		*		*			+		
F. Aesthetic values	*			*				+			+		

(Continued)

Grade-content assignments (continued)

Area and Major Topics	Grade Level												
	K	1	2	3	4	5	6	7	8	9	10	11	12
III. Energy (Yellow)	+	+	+	+	+	+	+			+		*	+
A. Properties of matter related to energy	+			*			*			*		+	*
B. Sources and conservation of energy	+			+		*				+		+	+
C. Mechanical energy and simple machines	*		*	*			*			*		+	
D. Gravitational energy	+			+			+			+		+	
E. Magnetic energy	*		*	+	*					+		+	
F. Sound		*	*				*			+		+	
G. Electrical energy		*		*		*				*		*	
1. Static						+				+		+	
2. Current		*		*		+				*		+	
H. Communication bands and electronics												+	
I. Heat and infrared radiation	*			*		*				+		+	
J. Light and ultraviolet radiation	*	*	*				*			+		+	
K. High energy waves												+	
L. Chemical energy				+			*			*			*
M. Atomic energy							+			+		+	*

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Area and Major Topics	Grade Level												
	K	1	2	3	4	5	6	7	8	9	10	11	12
IV. The Universe (Blue)	+	+	+	+		*	+		*	+			
A. Earth	+	*	*	*		+			+				
B. Moon	*		*			+			+				
C. Sun	*	*	*	*		+			+				
D. Solar system						+			+				
E. Stars and galaxies	*		*	*		+			+				
F. Space travel		+	+	+			*			*			

Key to symbols -- * major emphasis

+ content to be taught

Note: Conservation and safety must permeate science teaching at all grade levels.

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CONCEPTS

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Kindergarten

ALLOCATION OF CONCEPTS BY UNIT TITLES

Note: This report presents a list of unit titles, within which the order of the concepts found in the Handbook has been changed to provide a logical teaching approach.

Introduction to Science

Science and how we learn about it

1. The things to study in science are all around us.
2. Our environment contains many different kinds of materials.
3. The satisfying of natural curiosity is good science.
4. There are different ways of observing.
5. Careful observation is an important part of science.
6. Scientists may use tools and equipment in carrying on experiments.
7. Tools used in scientific experimentation must be handled with care.

I. The Earth

A. Finding out about our earth

1. The earth is very big and round like a ball.
2. The earth is made of land, water and air.
3. The land and ocean are parts of the earth.
4. A mountain is a very high hill.
5. Rocks are found in many places.
6. All rocks are not the same size.
7. Some rocks have layers.
8. Most rocks are not shiny.
9. All rocks are not the same color.
10. Rocks may be all one color or combinations of different colors.
11. Some pieces of rock are smoother than others.
12. Things fall due to gravity.

B. Seeing differences in materials

1. Some things on earth are heavier than others.
2. Some solids are harder than others.
3. Some substances disappear in water.
4. Any substance occupies space and has weight.
5. No two substances can occupy the same space at the same time.
6. Some materials absorb water.
7. Some solids dissolve in water.
8. Some liquids flow more easily than others.

C. Water and air around us

1. The sun's energy evaporates water from the surface of the earth all the time.
2. There is a constant evaporation of water from the earth through green foliage.
3. Water is important to all living things.
4. Water is used in many ways.
5. Water is a useful liquid.
6. When water evaporates it disappears in the air.
7. Water flows downhill.
8. Air is everywhere.
9. Water is present in the air.
10. Wind is air in motion.

II. Living Things

A. Things that are alive

1. Plants and animals are alive.
2. Animals are dependent on plants.
3. Plants and animals need protection from the weather.
4. Some plants and animals need care.
5. Living things need food, air and water.
6. Animals and plants may provide food and clothing.
7. Many changes in plant and animal life occur seasonally.

B. How animals are different

There are many kinds of animals.

1. Body coverings
   - a. Animals have different coverings on their bodies.
   - b. All birds have feathers.
   - c. Most fish are covered with scales.
   - d. Many wild animals are difficult to see because of their color.

2. Movement
   - a. Animals move about in different ways.
   - b. Some animals travel in the air.
   - c. Some animals travel in or on land.
   - d. Some animals travel in or on water.

3. Habitat
    a. Animals have different kinds of homes.
    b. Some animals live in water; some live on land.
    c. Some animals may live on land and in water.
    d. An animal may live in different places in different seasons.

4. Usefulness
    a. Some animals are useful to man.
    b. Animals are useful in many different ways.
    c. Some animals work for man.
    d. Many animals help the gardener
    e. Many birds help the gardener.

C. Enjoying animals
    1. Some animals are kept as pets.
    2. Pets can be trained.
    3. Bird houses, baths, and feeders increase the opportunities to observe and enjoy birds.

D. Plants around us

1. Plants are all about us.
2. Plants provide food for many animals.
3. Man uses plants.
4. Plants vary in size, color and shape.
5. Plants need air, water, sun and soil.
6. Roots hold plants in the ground.
7. Some plants have roots which anchor them in the ground.
8. Most flowering plants grow from seeds.
9. Most wild flowers should not be picked.
10. Most wild flowers should be allowed to grow so that they can be enjoyed by others.
11. There are many kinds of plants.

E. What our bodies need

1. Many plants are used as food.
2. Children need proper food to grow and stay healthy.
3. Children need rest to grow and stay healthy.
4. An important part of disease prevention is personal responsibility for one's body condition.
5. Regular consultations with the family physician tend to reduce occurrence and severity of some diseases.

III. Energy

A. Magnets are fun

1. Magnets pick up some things.
2. Some things stick to magnets.
3. Magnets attract most things made of iron and steel.
4. Some things cannot be picked up by magnets.

B. Simple machines

1. A machine is a device that helps people in everyday tasks.
2. Wheels are useful in moving people and things.
3. It is easier to roll a load on wheels than to drag it across a rough surface.
4. Things fall due to gravity.

C. How light helps us

1. We need light to see.
2. The earth gets its light from the sun.
3. Energy from the sun changes something in our skin.
4. Light is necessary for us to see with our eyes.
5. Our eyes adjust to the amount of light.
6. Too much sunlight (or other light) can be dangerous.
7. Electricity may give us light.

D. Keeping warm

1. The sun gives off heat.
2. Electricity may give us heat.
3. Heat may be helpful or harmful.
4. Some things are warm and some things are cold.

IV. Universe

We look at the sky

1. The sun appears to move across the sky.
2. The sun first appears in the east in the morning.
3. The sun seems to disappear in the west at night.
4. Many kinds of energy come from the sun.
5. The moon is often seen in the sky.
6. We can sometimes see the moon and stars at night.
7. The moon appears to move slowly across the sky.
8. The moon is shaped like a ball.
9. The moon appears to change in size and shape.
10. The moon seems to rise and set.
11. The stars cannot be seen during the day.
12. There are many, many stars.
13. Stars are far, far away.

RESOURCE UNIT

A RESOURCE UNIT

I. THE EARTH - -

B. SEEING DIFFERENCES IN MATERIALS

TO BE TAUGHT IN
KINDERGARTEN

To be included in the Kindergarten Supplement of the
Reorganized Science Curriculum

Minneapolis Public Schools
Science Department

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INTRODUCTION

This resource unit contains ideas and suggestions to help the teacher plan her unit of instruction. The suggested activities are planned for pupil learning through participation and are not intended to be used as demonstrations by the teacher. Because of the socio-economic differences among students in the Minneapolis Public Schools which result in different backgrounds of experiences, each teacher must use her professional judgment in determining the following:

- what time of the year to teach this unit
- how to integrate it into the content of the other subject areas
- how to motivate the children for this unit
- how much time to spend on the unit
    - many more suggestions than a teacher could possibly use with one class have been included
    - each teacher must select those activities which will help her in planning, developing and teaching the unit for a particular class
- how much to be done in any one day
- how to introduce each activity
- how much work the children should do to build their own ever-expanding vocabulary
    - no attempt has been made in the writing of this resource unit to build a common, city-wide vocabulary

There is a warning regarding the activities and references involving "air" and "erosion" which must be observed with this unit. Since the study of the topics, "Air Around Us" and "Rocks and Soils", has been allocated to Grade One, emphasis in Kindergarten must be on air as one of the many materials which has certain characteristics and erosion as one method of showing differences in hardness.

I. CONCEPTS INCLUDED IN THIS UNIT

1. Some things on earth are heavier than others.
2. Some solids are harder than others.
3. Some substances disappear in water.
4. Any substance occupies space and has weight.
5. No two substances can occupy the same space at the same time.
6. Some materials absorb water.
7. Some solids dissolve in water.
8. Some liquids flow more easily than others.

II. LEARNING ACTIVITIES

Concept #1 - Some things on earth are heavier than others

Activity A: Comparing sizes and weights of a material

Materials:

Blocks, wooden, various sizes
Bags, plastic

What to do:	Discovering that:
1. Lift two blocks of different sizes. Compare their weights.	1. Like things of different sizes have different weights.
2. Lift two blocks of same size. Compare their weights.	2. Like things of the same size weigh the same.
3. Select one large block and enough small blocks to equal the weight of the large block. Place the small blocks in a plastic bag. Compare the weights of the large block to the weight of all the small blocks by lifting.	3. In using objects of the same material, the weight of several small ones sometimes equals the weight of one large one.

Activity B: Comparing the size of equal weights of different solids

Materials:

Heavy material, 1 pound package,
such as modeling clay or sugar

Bulky material, 1 pound package,
such as absorbent cotton, sawdust
or vermiculite

What to do:	Discovering that:
1. Compare by lifting a one pound package of the heavy (more dense) material and a one pound bag of the bulky (less dense) material.	1. Different sizes or amounts (volumes) of different things sometimes weigh the same.

Activity C: Comparing weight using solids

Materials:

Objects and materials, such as:
- Sand
- Soil
- Sawdust
- Cotton, absorbent, unsterilized
- Pebbles
- Rocks
- Marbles, steel
- Marbles, glass
- Eraser, felt
- Wood, block size of eraser
- Plasticine, 1 pound box

Bags, paper (some small, some large)
Bags, plastic

What to do:	Discovering that:
1. Fill a large paper bag with absorbent cotton, and a small paper bag with sand. Lift the bags. Compare the weights.	1. Big objects are not always the heaviest. Size does not always determine weight.
2. Repeat the activity, using a different combination of materials in different sized paper bags or plastic bags.	2. Different materials have different weights.
3. Repeat the activity, using different amounts of the same material.	3. Different amounts of the same material have different weights.
4. Place a felt eraser in a bag and a block of wood of the same size in another bag. Lift the bags. Compare the weights.	4. Objects of the same size do not always weigh the same.

Concept #2 - Some things on earth are harder than others

Activity A: Showing that some things are punctured more easily than others

Materials:

- Hammer
- Nail
- Wood, hard and soft (many varieties)
- Sod or hard packed dirt
- Pencil, sharpened
- Clay, modeling, non-hardening
- Clay, modeling, gray, hardened

What to do:	Discovering that:
1. Press a nail into the different kinds of wood. Have a hammer available to use to pound the nail into harder wood.	1. Some materials are harder to press things into. Not all things are equally hard. The harder an object is pressed the farther it goes into something.
2. Feel the hardness of non-hardening clay. Compare it with gray clay which has hardened.	2. Some things are soft and others are hard.
3. Try to force a nail into non-hardening clay. Do the same with hardened clay. Compare the results.	3. It is more difficult to poke something into a hard substance than into a soft substance.
4. Demonstrate the effect of using a sharp instrument and a dull instrument on clay (non-hardened and hardened). Push the blunt end of the pencil into the soft clay. Push the sharp end of the pencil into the soft clay. Compare the amount of push required in each try. Try to push the blunt end of the pencil into the hard clay. Compare results. Repeat this activity by trying to push each end of the pencil into sod and/or hard packed dirt on the playground. Compare results.	4. It requires less push to penetrate some materials with a sharp tool than with a dull tool. A sharp tool does not easily penetrate hard materials.

Activity B: Showing that harder materials do not wear away as fast as soft things

Materials:

Instrument, blunt
Instrument, sharp
Shoes, gym, overshoes or rubbers
Sandpaper
Eraser, art gum
Plaster of Paris
Wood
Rock

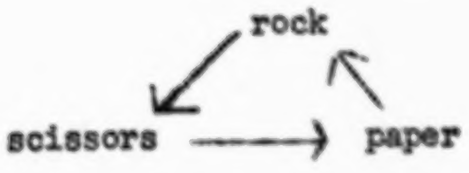
What to do:	Discovering that:
1. Compare the soles on gym shoes, overshoes or rubbers. Observe what is happening to the soles of the shoes over an extended period of time.	1. The soft rubber sole is worn away by hard floors and sidewalks.
2. Use sandpaper on various materials such as wood and rock. Observe what happens.	2. Sandpaper can wear away some soft materials.
3. Use an art gum eraser on paper. Observe what happens to the eraser.	3. An art gum eraser is soft and wears down as it rubs marks off the paper.
4. Rub a piece of hardened plaster of Paris with a rock. Observe what happens to the plaster of Paris.	4. Some solid materials are harder than others.

Activity C: Playing a game which depends on differences in materials

Materials:

Scissors
Paper
Rock

What to do:	Discovering that:
1. Demonstrate that rocks can grind scissors, scissors can cut paper and paper can cover rocks.	1. A characteristic of a material may be chosen to demonstrate the superiority of one material over another material.
2. Play the scissors, paper and rock game.* Use a closed fist to represent rock, two fingers to represent scissors, and an open hand to represent paper. Close the hands to form a fist. Thump on a knee with each fist counting "1, 2, 3". Make the sign for rock (closed fist), scissors (two fingers) or paper (open hand) at the count of three. Decide the winner by determining who is making the sign for the material which is "superior" to the other material. (Rock is "superior" to scissors because rock can dull scissors, scissors are "superior" to paper because scissors can cut paper, and paper is "superior" to rock because paper can cover rock.)	



*The teacher should guide the activity carefully. See the Handbook of Active Games for further information.

Concept #3 - Some substances disappear in water

Activity A: Comparing liquids put into water

Jars, glass, small, baby food
Teaspoon
Liquids such as:
- Corn syrup - light and dark
- Molasses
- Milk
- Coffee
- Tea
- Water
- Cooking oil
- Vinegar

What to do:	Discovering that:
1. Fill a baby food jar about 1/2 full of water. Add about one teaspoon of light corn syrup. Stir. Observe.	1. The syrup disappears in water.
2. Repeat the activity, using different liquids, each in a different jar.	2. Some liquids disappear in water. Some liquids change the appearance of water. Some liquids do not disappear in water.

Activity B: Comparing powdered solids put into water

Materials:

Powdered solids such as:
- Detergent
- Baking soda
- Flour
- Cornstarch
- Salt
- Milk, powdered
- Baking powder

Jars, glass, small, baby food (several)
Water
Teaspoon
Tablespoon

What to do:	Discovering that:
1. Fill several baby food jars about one-half full of water. Put a different powdered substance into each jar. Observe. Stir. Observe again.	1. Some powdered substances disappear in water. Some powdered substances change the appearance of the water. Sometimes powdered substances do not disappear in water.
2. Repeat the above activity using two tablespoons of each substance. Stir. Observe. Let the jars stand. Observe again.	2. Sometimes not all of a powdered substance can disappear in water.

Activity C: Comparing granular solids put into water

Materials:

- Jars, glass, small, baby food
- Salt, table
- Sugar, granulated
- Sand, washed, white
- Water
- Teaspoon
- Tablespoon

What to do:	Discovering that:
1. Fill a baby food jar about one-half full of water. Place a pinch of granulated sugar in the jar. Let it stand. Do not stir. Observe what happens after a few minutes.	1. A very small amount of sugar disappears in water. Sugar does not always immediately disappear in water.
2. Place about one tablespoon of granulated sugar in two other jars each about one-half full of water. Stir one of the jars. Observe what happens. Compare the difference in appearance of the two jars.	2. Stirring makes sugar disappear faster in water.
3. Place about one tablespoon of sugar in a jar about one-half full of water. Stir. Add 4 tablespoonfuls more sugar. Stir again. Let it stand. (Note: If large baby food jars are used, it may be necessary to add many more tablespoonfuls of sugar.) Observe what happens after a few minutes - after a whole day.	3. Sometimes all the sugar does not disappear in water.
4. Fill a baby food jar about one-half full of water. Add a pinch of salt. Let it stand. Do not stir. Observe what happens.	4. A small amount of salt disappears in water.

Activity C: (continued)

What to do:	Discovering that:
5. Fill a baby food jar about one-half full of water. Add a pinch of salt. Stir and observe. Add about 1 teaspoon of salt. Stir again. Observe what happens.	5. Sometimes all the salt does not disappear in water.*
6. Fill a baby food jar about one-half full of water. Add a pinch of washed white sand. Let it stand. Observe. Stir it. Observe again.	6. Some substances do not disappear in water.

*Note: Table salt obtained from the grocery store contains a small amount of magnesium carbonate which is added to prevent caking. This substance reacts with Minneapolis city water to form a white, flaky material. As a result, although the salt dissolves, the water becomes very cloudy.

Activity D: Observing ice in water

Materials:

Ice cubes
Water
Jar, glass, small, baby food

What to do:	**Discovering that:**
1. Place one or more ice cubes in a baby food jar about one-half full of water. Let it stand. Observe.	1. Ice disappears in water. (The ice does not dissolve; it melts. This is the only substance which can disappear in water without dissolving.)

Concept #4 - Any substance occupies space and has weight

Activity A: Showing that air occupies space

Materials:

Aquarium tank
Bottle, small necked
Jar, glass, small, baby food
Bags, plastic
Handkerchief
Balloon

What to do:	Discovering that:
1. Fill the aquarium about one-half full of water. Pack a handkerchief into the bottom of the baby food jar. Turn the jar upside down and push it to the bottom of the tank. Take it out without tipping. Remove the handkerchief and observe that the handkerchief is dry.	1. The dry handkerchief is evidence that air takes up space and liquids cannot go into the same space.
2. Fill the aquarium about one-half full of water. Turn an empty jar upside down and push it to the bottom of the tank. Observe the line between the air and the water. Take the jar out of the tank.	2. The air occupies the space and keeps the water out.
3. Fill the aquarium about one-half full of water. Turn a small necked bottle upside down and push it to the bottom of the tank. Turn the bottle on its side slowly, bringing the opening of the bottle up. Observe the open end of the bottle. Remove the bottle from the water and note whether there is water in the bottle.	3. Air takes up space and has to come out before liquids can go into a container.

Activity A: (continued)

What to do:	Discovering that:
4. Blow air into a plastic bag and watch it expand. Suck the air out. Watch it collapse.	4. Air can fill a container. If air is taken out, a container may collapse.
5. Blow air into a balloon and watch it expand. Hold the opening of an inflated balloon near a child's cheek. Allow the air to escape and have him feel the air push against his cheek. Notice that, as the air rushes out of the balloon, the balloon collapses.	5. If air is forced into a balloon, it causes the balloon to get larger. When the collapsing balloon forces the air out, the space occupied by the air in the balloon decreases.

Activity B: Observing that air occupies space in some substances

Materials:

Jar, glass, small, baby food
Jar, paste, empty (large size)
Soil, dry, loose
Water
Sponge, cellulose

What to do:	Discovering that:
1. Fill a small glass jar with dry, loose soil. Water the soil and look for bubbles which come to the top from the soil.	1. Air in the soil rises to the top when water seeps into its place. Two substances cannot occupy the same place at the same time.
2. Fill a large paste jar half full of water. Force a cellulose sponge to the bottom of the jar and press on it. Watch the air bubbles come out of the sponge.	2. When the sponge is put into water, the air which is in the sponge is replaced by water.

Activity C: Showing that air occupies space and has weight

Materials:

- Balloons
- Yardstick (or 3" dowel rod)
- Inner tubes (two of the same size)
- Pump, tire
- Thread (or fish line)
- Pin, sharp

What to do:	Discovering that:
1. Lift two empty inner tubes. Compare the weights. Pump air into one inner tube and leave one inner tube flat. Lift each tube and describe which is heavier.	1. Things that are alike have the same weight. Air causes an object to inflate. Air adds weight to an object.
2. Make a balance stick by suspending the center of a yard stick or a three foot long dowel rod from a light fixture with thread or fish line. Adjust the thread or fish line so that the yardstick or dowel rod hangs horizontally and is in balance. Blow up two balloons to approximately the same size. Tie one balloon to each end of the balance stick, adjusting them so the stick remains in balance. Puncture one balloon, using a sharp pin or needle to make a small hole near the neck of the balloon. Observe what is happening to the blown up balloon which is left on the stick.	2. When air comes out of something, the object becomes lighter. When things weigh the same, the balance stick stays horizontal; but when one end is heavier, it goes down.

Activity D: Showing that substances occupy space and have weight

Materials:

- Water
- Sand, white
- Jars, glass, small, baby food
- Pennies, several

What to do:	Discovering that:
1. Fill two jars to the same height, about one-half full of water. Observe that the water goes to the bottom of the jar. Pour sand slowly into one of the jars and observe that the sand goes to the bottom because of its greater weight. Note that the water rises in this jar. Compare the height of the water in the two jars.	1. Heavier things sink to the bottom. As the sand is added, the water rises because the sand occupies some of the space originally occupied by the water.
2. Fill two jars to the same height, about one-half full of water. Drop pennies, one at a time, into one of the jars and watch the water rise as the pennies partially fill the jar. Compare the height of the water in the two jars.	2. When a substance (pennies) is put into a container of water, the solid takes up some of the space.

Concept #5 - No two substances can occupy the same space at the same time

Activity A: Using materials to show that substances occupy space, and that no two substances can occupy the same space at the same time

Materials:

- Blocks, wooden, several
- Bottle, small necked
- Jar, glass, small, baby food
- Chalk
- Pencils
- Pencil sharpener
- Peg board and pegs
- Water
- Milk (to fill baby food jar)
- Pan, about 8" x 8" x 1" deep
- Chairs
- Jump rope, about 8' long
- Aquarium

What to do:	Discovering that:
1. Pile up several blocks. Try to push a block into the space occupied by another block without moving the block which is already there.	1. A wooden block must push another out of the way before it can take its place.
2. Fill the aquarium about one-half full of water. Place an inverted small necked bottle into the tank of water. Tip the bottle while it is still submerged to let the air out. Observe.	2. When air occupies a space, it can keep other substances out. Air must come out before water goes in.
3. Draw a circle on the floor with chalk. Make it only large enough for the feet of one child to stand in. Step into the circle. Ask another child to try to enter the circle. See what happens.	3. There is not room for the feet of two children within the circle. Two children cannot stand in the same place at the same time.
4. Draw a large circle on the floor with chalk. Fill the circle with children standing up straight. Try to add another child. Observe what happens. Repeat, using a different sized circle.	4. There is a limit to the number of individuals that can be placed in the available area. Different sized areas can contain different amounts.

Activity A: (continued)

What to do:	Discovering that:
5. Tie the ends of the jump rope together. Place the rope on the floor forming a circle. Have six children step into the circle. Have the children pick up the rope and hold it at hip level. Have other children get inside the rope, one at a time. Observe what happens.	5. There is a limit to the number of children that can stand inside a rope loop. (Note: When this was tried, twenty children fitted into the loop of a rope 10½' long).
6. Put a pencil in the pencil sharpener. Try to put another pencil in without removing the one already in the sharpener. Observe what happens.	6. One thing must be taken out of a place before a different one can go in.
7. Fill a peg board with pegs. Try to put two pegs in each hole. Note that it cannot be done.	7. Two solid substances cannot occupy the same space at the same time.
8. Put two baby food jars in a pan. Fill one with water. Fill the other with milk. Try to pour the jar of milk into the jar of water. Observe what happens.	8. One container cannot hold the contents of two containers.
9. Use three baby food jars which are the same size. Put an empty jar in a pan. Try to pour a full jar of water and a full jar of milk at the same time into the empty jar. Observe what happens.	9. If the containers are all equal in size, one container cannot hold the contents of two containers even if the two liquids are added at the same time.
10. Fill a pan completely full with water. Put a hand into the water. Observe.	10. Water is forced out of a full container when something else is added.

Concept #6 - Some materials absorb water

Activity A: Observing that some materials absorb water and some do not

Materials:

Paper, wax
Saran wrap
Aluminum foil
Bag, plastic
Newspaper
Medicine dropper
Paper, tissue
Paper, wrapping
Blotter
Cloth, absorbent
Tissue, cleansing

What to do:	Discovering that:
1. Place samples of wax paper, Saran wrap, aluminum foil, plastic bag, newspaper, tissue paper, wrapping paper, blotter, absorbent cloth and cleansing tissue on a table. Use a medicine dropper to place a drop of water on each sample. Observe what happens to each sample. Compare the results for the different samples.	1. Some materials absorb water and some materials do not absorb water.

Activity B: Observing different materials as water is put on them

Materials:

- Sponge
- Sand
- Cloth
- Wood
- Cotton, absorbent, unsterilized
- Towels, paper, absorbent
- Medicine dropper
- Tablespoon
- Dish or foil plate (several)
- Water
- Blotter
- Rocks (pumice, volcanic ash) or briquettes
- Rice
- Newspaper
- Bread, dry, or rusk
- Cereal (cornflakes, bran flakes, uncooked cream of wheat, uncooked oatmeal)

What to do:	Discovering that:
1. Place a small amount of several of the above materials, each in a separate dish or foil plate. Use a medicine dropper to put 10 drops of water on each substance and observe how soon the water disappears.	1. Some materials absorb water faster than others. Some materials do not absorb water.
2. Put a tablespoon full of water on each of the materials in Step no. 1 which absorbed water. Observe which materials absorb this water. Add more spoonfuls of water to each material until no more is absorbed.	2. Some things absorb more water than others.

Activity C: Illustrating that materials which do not absorb water may be used to keep other materials dry

Materials:

Rubbers, pair
Socks, sweat (several pair)
Pan, about 8" x 8" x 1" deep
Water

What to do:	Discovering that:
1. Use one pair of sweat socks. Place one sock in a pan of water about 1/2" deep. Observe what happens. Take the sock out of the pan of water. Wring the water out of the sock.	1. Socks absorb water.
2. Place a dry sweat sock on a foot and put on one of a pair of dry shoe rubbers over the sock. Step into the same pan of water taking care to avoid splashing. Take the foot out of the pan of water. Remove the rubber and sock. Try to wring water from the sock. Observe.	2. Rubbers prevent the sock from absorbing water.

Concept #7 - Some solids dissolve in water

Activity A: Comparing solids put into water

Materials:

- Jars, glass, small, baby food
- Water
- Kool-Aid
- Sugar, loaf
- Red Hots (cinnamon candy)
- Pebbles, the same size as Red Hots, washed
- Rice
- Sand
- Sugar
- Salt
- Baking soda
- Baking powder
- Cornstarch
- Milk, powdered
- Cocoa
- Paint, tempera

What to do:	Discovering that:
1. Fill a baby food jar about one-half full of water. Add one tablespoon of Kool-Aid. Stir. Observe what happens.	1. Kool-Aid dissolves in water. Kool-Aid changes the appearance of water.
2. Continue the above activity by placing the container, uncovered, in a warm place in the room. Observe what happens after several days when the water has evaporated.	2. The Kool-Aid remains in the container after the water has evaporated.
3. Repeat Step nos. 1 and 2 of this activity using loaf sugar.	3. The sugar dissolves in water, but remains in the container after the water has evaporated.
4. Set an uncovered container of tap water in a warm place in the room. Observe what happens after several days when the water has evaporated.	4. Tap water has solids dissolved in it.
5. Fill two baby food jars about one-half full of water. Add two small pebbles to one jar. Add two Red Hots to the other jar. Stir both the pebbles and the Red Hots. Observe what happens. Allow the jars to stand and observe again. Repeat the above activity using a pinch of each of different pairs of solid materials such as baking soda and cornstarch.	5. Some solids dissolve in water. Some solids do not dissolve in water.

Concept #8 - Some liquids flow more easily than others

Activity A: Using liquids of various consistencies to show that they have different flowing properties

Materials:

Water
Paint, tempera
Alcohol, rubbing
Cologne
Turpentine
Coffee
Milk
Tea
Cement, rubber
Syrup, corn (light, dark)
Molasses
Oil, motor (lubricating oil)
Oil, cooking
Jars, glass, small, baby food (with tight caps)
Shampoo
Soda pop
Cream, whipping
Starch, liquid, thick
Honey
Ginger ale
Paste, thin flour
Soap, green
Starch, boiled (prepare at home)
Wave set
Buttermilk, cultured

What to do:	Discovering that:
1. Place some of the materials in baby food jars filled about one-half full. Smell, feel and observe the liquids in the jars. Make comparisons to note differences and similarities.	1. All liquids are not alike.
2. Tightly cap the jars containing the materials used for Step no. 1 above. Shake the jars. Invert the jars. Observe the ease of movement of the liquids within the jar.	2. Color or appearance alone does not predict flowing quality. The thicker the liquid, the more slowly it flows. The thinner the liquid, the more rapidly it flows.
3. Open a few of the jars used above and pour the liquids slowly into other empty jars. Observe the differences in pouring speed. Note that materials that pour slowly seem to be thicker.	3. The thinner the liquid, the more rapidly it pours. The thicker the liquid, the more slowly it pours. Liquids must be shaken or poured in order to determine flowing quality.

III. BIBLIOGRAPHY

A. Textbooks

Bond, Austin D., et al, Getting Ready, Lyons and Carnahan, 1958.
p. 35 Some things absorb water.
pp. 46-47 Two things cannot occupy the same space.

Craig, Gerald S., and Bernice C. Bryan, Science and You, Ginn, 1955.
pp. 4-15 Some things absorb water.
p. 59 Ice disappears when it melts in a glass of water.

Frasier, George W., et al, We Ask, Singer Science Series, Singer, 1955.
pp. 8- 9 Air occupies space.

Thurber, Walter A., Exploring Science - One, Allyn and Bacon, 1955.
pp. 82-95 Two substances cannot occupy the same space at the same time.
pp.124-125 Any substance occupies space and has weight.
pp.128-129 Air occupies space.

B. General references for the teacher

Blough, Glenn O., et al, Elementary-School Science and How to Teach It, Dryden, rev. ed., 1958.
pp. 129-134 Discusses the part played by running water, glaciers, and wind in changing the earth's crust.
pp. 135-140 Discusses what soil is and how it is made; what rocks are and how they are made.

Craig, Gerald S., Science for the Elementary-School Teacher, new ed., Ginn, 1958.
pp. 367-368 Discusses differences in substances, such as hardness, color, solubility and characteristic odor.

Fuller, Elizabeth M., and Mary J. Ellis, Springboards to Science, Denison, 1959.
pp. 8, 10, 11
28, 29 Suggests experiences related to the unit.

Hindman, Darwin A., Handbook of Active Games, Prentice-Hall, 1951.
p. 183 Provides more detailed instructions for the paper, rock and scissors game.

Sheckles, Mary, Building Children's Science Concepts, Teacher's College, 1958.
pp. 66- 67 Provides information concerning how water moves through finely divided solid materials.
pp. 85- 90 Suggests many activities to illustrate that air occupies space and has weight.
pp. 119-128 Provides suggestions for ways to find out some things are heavier than others and that some things dissolve and others do not.
p. 132 Suggests observation of water in its solid form.

C. Audio visual and other sensory aids

1. Films

Ways to Find Out

Churchill-Wexler, 1957; 11 min., color

To be used as an introduction to the unit. Stresses children's use of hearing, seeing, feeling and listening - awareness of one's senses.

Air All Around Us

Young America, 1948; 10 min., black and white

To be used with advanced group or for enrichment. Illustrates experiments useful in discovering some properties of air.

2. Filmstrips

How Things in the World Change

Popular Science, 1950; 50 frames, color
"Matter and Energy" series, 3 filmstrips in series

A few of the frames show solids, liquids and gases.

Structure of Matter

Jam Handy Organization, 1947; 67 frames, black and white
"Air Age Physics" series, 6 filmstrips in series

A few of the frames show ways water changes its form.

Geology

Teaching Aids Laboratory, Ohio State University, 1956;
41 frames, color

Several frames show wearing away of rock by wind and weather.

2. Filmstrips (continued)

Work of the Waves

Society for Visual Education, 1950; 44 frames, black and white

A few of the frames show wearing away of rock by water, changing the rock to sand.

The Story of Earth We Find in the Rocks

Jam Handy Organization, 1947; 72 frames, black and white
"Our Earth" series, 4 filmstrips in series

Portions of this filmstrip show wearing away of rock by forces of nature.

IV. SUGGESTED SUPPLIES AND EQUIPMENT

*Alcohol, rubbing
*Aluminum foil
*Aquarium tank

Bags, paper, large (several)
Bags, paper, small (several)
Bags, plastic, various sizes (several)
Baking powder
Baking soda
*Balloons
Balloon pump (available in most stores that sell balloons)
Blocks, large wooden (several)
Blocks, wooden, various sizes
Blotter
Bottle, small necked (pop bottle)
Bread, dry, (or Rusk)
Briquettes
Buttermilk, cultured

Cement, rubber
Cereals, small amounts of various kinds (bran flakes, corn flakes, uncooked Cream of Wheat, uncooked oatmeal)
Chairs, small (several)
Chalk
Clay, modeling, 1 lb.
Clay, modeling, non-hardening
Clay, modeling, gray, hardened
Cloth
Cloth, absorbent
Cocoa
Coffee
Coffee, powdered
Cologne
Cornstarch
Corn syrup (light, dark)
*Cotton, absorbent, unsterilized
Cream, whipping

Detergent, powdered
Dishes, metal, playhouse (or foil plate)
Dirt, hard packed

Eraser, art gum
Eraser, felt

Flour

Ginger ale

Hammer
Honey

Ice cubes
Inner tubes, two of same size
Instrument, one blunt
Instrument, one sharp

Jar, large mouthed to fill with water, or drinking glass
Jars, glass, baby food (with tight caps)
Jars, glass, small, baby food (several)
Jars, paste, empty, large
Jump rope

Kool-Aid

Marbles, glass (several)
Marbles, steel (several)
*Medicine dropper
Milk
Milk, powdered
Molasses

Nail
Newspaper

Note: Asterisked (*) items on this list are on the Elementary Science Supplies List and may be requisitioned in the usual way on the form 1000. Other items listed are used in such small quantities that it appears to be expeditious to bring them from home or to request the children to bring them.

Suggested Supplies and Equipment - (continued)

Oil, cooking
Oil, motor (lubricating oil)
Overshoes

Paint, tempera
Pan, about 8" x 8" x 1" deep
Paper
Paper, tissue
Paper, towels, absorbent
Paper, wrapping
Paste, thin flour
Pebbles, size of Red Hots cinnamon candy
Peg board and pegs
Pencils
Pencil sharpener
Pennies, several
Pin, sharp
Plaster of Paris
Plasticine, 1 lb. box

Red Hots, cinnamon candy
Rice
Rocks
Rocks: granite
    pumice
    volcanic ash
Rubbers

Salt, table
Sand
Sand, white
Sandpaper
Saran wrap
Sawdust, 1 lb. bag
Scissors
Shampoo
Shoes, gym
Soap, green
Socks, sweat (several pair)
Sod
Soda pop
Soil, loose, dry
Sponge
Starch, boiled
Starch, thick liquid
Sugar, loaf
Sugar, granulated, 1 lb.

Tablespoon
Tea
Teaspoon
Tire pump
Tissue, cleansing
Thread (or fish line)
Tumbler, plastic
Turpentine

Vermiculite

Water
Wave set
Wax paper
Wood, block, size of felt eraser
Wood, hard and soft (many varieties)

Yardstick (or 3' dowel rod)

(Typed by NM, 6-26-62)

A KINDERGARTEN RESOURCE UNIT

Developed by a group of Second Year Probationary Teachers

IV. UNIVERSE --

WE LOOK AT THE SKY

Correlated to the Unit Titles as found in the
Reorganized Science Curriculum

Minneapolis Public Schools
Department of Elementary Curriculum
June 20, 1961

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I. CONCEPTS INCLUDED IN THIS UNIT

1. The sun appears to move across the sky.
2. The sun first appears in the east in the morning.
3. The sun seems to disappear in the west at night.
4. Many kinds of energy come from the sun.
5. The moon is often seen in the sky.
6. We can sometimes see the moon and stars at night.
7. The moon appears to move slowly across the sky.
8. The moon is shaped like a ball.
9. The moon appears to change in size and shape.
10. The moon seems to rise and set. *
11. The stars cannot be seen during the day.
12. There are many, many stars.
13. Stars are far, far away.

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*This resource unit does not contain any activities for Concept #10.

II. LEARNING ACTIVITIES

A. THE SUN

Concept #1 - The sun appears to move across the sky.

Activity 1: Tape or staple four or five discarded snapshot negatives together to make a dark viewer through which the children may look at the sun without damaging their eyes. Children may bring negatives from home so that each one may have his own viewer.

As soon as school has begun on a clear day, observe the position of the sun through the viewers. Look at it in relation to a particular tree, or chimney, or some other object. Where is the sun? Is it beside the chimney? Just above the tree?

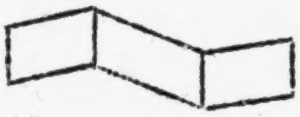
In about an hour observe the sun again from the same observation point. Where is the sun now? Can you see it above another tree? Above the telephone pole by the garage? What has happened since we first looked at the sun today? Yes, it seems to have moved.

Shortly before going home, observe again from the same spot. Where is the sun now? What has happened? Yes, it seems to have moved more.

Repeat on at least two other days so that the children see that the sun's apparent movement across the sky is a daily occurrence.

Activity 2: Have the children draw individual pictures of how the sun looked at each observation. Picture No. 1 may show the house across the street with the sun beside the chimney as seen at 9 a.m. Picture No. 2 may show the sun over the tree by the house across the street as seen at 10 a.m. Picture No. 3 may show the sun over the tree in fromt of the house across the street as seen at 11 a.m.

Activity 3: Paint or draw three identical scenes showing things that can be seen from the same observation point. Mount them on a bulletin board or fashion them into an accordion-type frieze, e.g.,

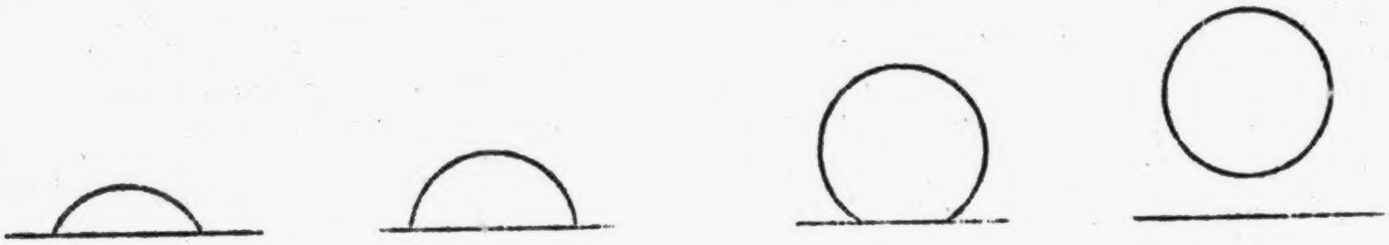


Activity 4: Have the children cut out three suns. After each observation, a child may paste a sun on the frieze in the place it was observed. (Over the tree, beside the chimney, etc.) This idea may also be used for a flannel board.

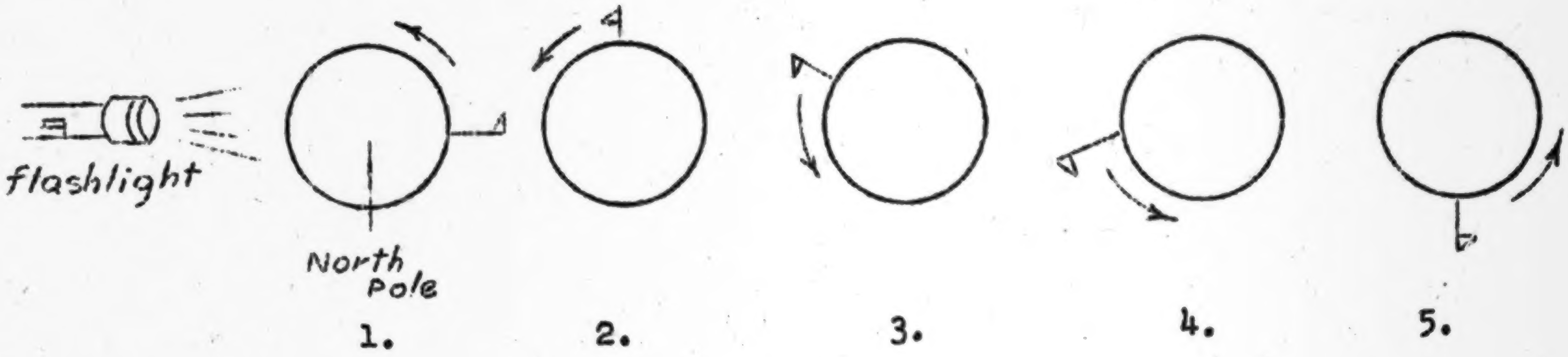
Activity 5: Look at pictures of the sun in various positions in the sky.

Activity 6: Home work.

Have the children observe where the sun is when they first get up in the morning. Near the horizon? Partially below? Children may make suns to place on the flannel board to show the position of the sun.



Activity 7: Place a small flag on the approximate location of Minneapolis on the globe. Have one child hold a lighted flashlight to represent the sun. The globe should be held so that it may be viewed from the North Pole. Turn the globe counter clockwise. The children can see that the sun appears to move across the sky as the earth turns.



Acticity 8: On a clear day soon after the children arrive, place a piece of tape on the floor or wall to indicate where the sunlight from the upper right hand corner of a particular window strikes the floor or wall.

After about an hour, place another piece of tape to indicate where the light strikes now. Is it the same place? Repeat before going home. What has happened? (The sunlight strikes in a different place.) Why has the sunlight moved? (The sun has seemed to move.)

Concept #2 - The sun first appears in the east in the morning.

Activity 1: On a clear day in the morning look out of an east window. Can you see the sun?

If the children have difficulty understanding east and west, it may be helpful to tell them that we locate directions from the North Star. Explain the location of the North Star and tell them that east is always to the right of the North Star. Children may enjoy the game of "Directions".

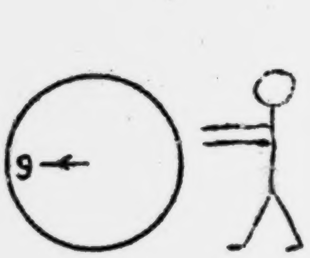
Game: The teacher designates an imaginary location for the North Star and the children use it in determining the directions, e.g.

Teacher: "If I am the North Star, where is east?" (children point)
"If the clock is the North Star, where is west?"
"If the flag is the North Star, where is south?" etc.

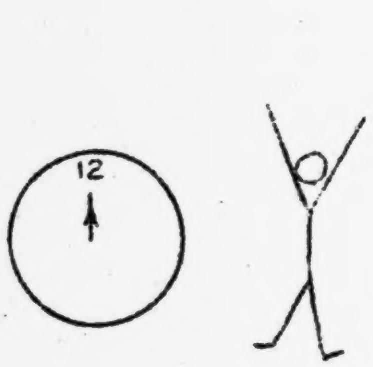
(Ed. Abstractions such as this cannot be understood by all children.)

Activity 2: Activity No. 1 for teaching Concept No. 1 may be repeated. The children can see that the sun appears in the east in the morning as the earth turns.

Activity 3: Set a Judy clock against a south wall. Move the hour hand of the Judy clock to 9 a.m., 12 noon, 3 p.m. A child may stand beside the clock and as the hour is moved, he may put his hands in each position imitating the apparent motion of the sun.



1.



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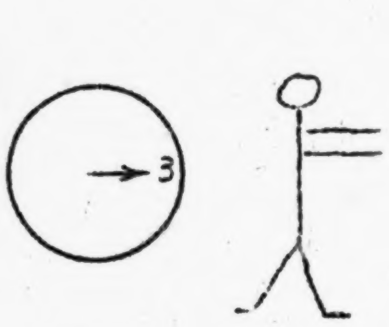

3.

Concept #3 - The sun seems to disappear in the west at night.

Activity 1: Late in the afternoon look out of an east window. Can you see the sun? Look out of a west window. Can you see the sun? Repeat on several different days.

Activity 2: Activity No. 1 for teaching Concept No. 1 may be repeated. The children can see that the sun seems to disappear in the west as the earth turns from west to east.

Concept #4 - Many kinds of energy come from the sun.

Activity 1: Use two healthy plants of the same variety and size. Give them both water but keep one in the light and the other in a dark room or closet. Observe and compare them each day, each week. Children will see that the one in the light stays green while the one in the dark loses its green coloring. Energy from the sun is necessary to keep green plants green.

Activity 2: Read the story, "Little Red Nose"*

Did you ever get a red nose? When? What made it red?

(Ed. Sunburn is due to chemical action, not heat.)

Activity 3: Stand in the shade; then in the sun. What do you feel?

What causes it? (Heat)

Activity 4: Place your hand on a shady spot on the sidewalk. Place your hand on a sunny spot on the sidewalk. What did you feel? What causes it? (Heat from the sun.)

Activity 5: Look at night pictures. Why do we need lights at night? (No sun to give light.) The sun gives light energy.

Activity 6: Pull down the black shades. Why did it get dark? (Most of the sunlight is shut out.)

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*See bibliography

B. THE MOON

Concept #5 - The moon is often seen in the sky.

Activity 1: Go outdoors and see the moon in the day sky. Repeat on several occasions. At the first quarter phase the moon rises about noon.*

Activity 2: Home work.

Look at the sky at night. Can you see the moon? Tell us tomorrow. Repeat on many occasions. The moon will rise about one hour later each day or night.*

Activity 3: Keep a record on the calendar of the days and/or nights the moon has been seen by the children before their bedtime during the month; during several months.

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*See bibliography

Concept #6 - We can sometimes see the moon and stars at night.

Activity 1: Use activity No. 3 suggested for teaching concept No. 1.

Activity 2: Look at pictures showing the night sky. Is there a moon in each picture? Is there a moon in some of the pictures?

(Ed. No suggestions have been made here for activities to teach that are sometimes seen at night.)

Concept #7 - The moon appears to move slowly across the sky.

Activity 1: If the days are clear, observe the moon during the first two days that it is in the first quarter. Begin observing at the beginning of the afternoon session and observe at one-half hour intervals.

Activity 2: Draw pictures to show where the moon was seen during the observations suggested in activity No. 1.

Children can see that the moon appears to move across the sky.

Concept #8 - The moon is shaped like a ball.

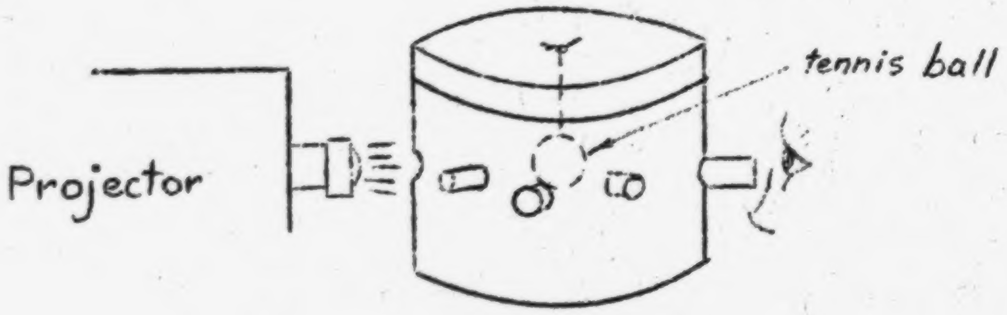
Activity 1: Use a volley ball to represent the moon. Use a 75 or 100 watt bulb to represent the sun. Let the light shine on the ball.

Activity 2: At about three inch intervals around the middle of a round hat box, cut holes the diameter of a tube from a roll of paper towels. Cut the paper towel tubes into approximately four inch lengths and fit them into all the holes, except one, around the middle of the box. Tape the tubes in place. Blacken the inside of the box.

Suspend a tennis ball which has been painted with shoe-white in the box so that it is in line with vision through the tubes. This will represent the moon.

Place a projector so that the light shines into the box through the hole without a viewing tube. This will represent the sunlight.

Have the children peek into the tube closest to the projector and see that the ball appears somewhat like the full moon and recognize that the moon is round like the ball.



Concept #9 - The moon appears to change size and shape.

Activity 1: Use the box suggested in activity No. 2 to teach Concept No. 8. Have the children peek into the various viewing tubes to see the effect of the light shining on the ball at different angles. Have the children tell what they see when they peek through each tube.

The children can see why the moon appears to change shape.

(Ed. No suggestions are given here for teaching that the moon appears to change size.)

Activity 2: Observe the moon at night and/or during the day many times during the month/year. Draw pictures of how it looked at each observation. Arrange the pictures on a chart or place in a booklet.

Flannelgraph moon phases may be provided for the children to manipulate.

C. THE STARS

Concept #11 - The stars cannot be seen during the day.

Activity 1: Draw the shades to darken the room. Use a 75 or 100 watt bulb to represent the sun and a tiny flashlight to represent a star. Turn on the tiny flashlight. Can you see its light? Leave the flashlight on. Now turn on the bright light also. Can you see the light from the flashlight now? Why not? (The strong light outshines the tiny one.)

Activity 2: Use a table lamp. Turn it on in a sunny place. Can you see the light?

Activity 3: Look at the street light and/or auto headlights on a sunny day. Are they on? Why not? (Their light would be outshown by the sun.) Are they bright?

Activity 4: At times Venus may be seen after sunrise. Watch it disappear as the sun rises higher. Why did it seem to "go out"?

Concept #12 - There are many, many stars.

Activity 1: Ask children how many stars they have seen. Ask them to try to count them and report the next day how many they could count. (More than they can count).

Activity 2: Look at filmstrips listed and try to count the stars which are visible on one picture.

There are others we cannot see. Why?

Filmstrips: The Earth and Universe Series
"Constellations"
"Stars and Galaxies"

Concept #13 - Stars are far, far away.

Activity 1: Place a tiny hole in a piece of cardboard. Let a child peek through the hole at another child who is standing close to him. How much of John can you see? John moves back. Now, how much of John can you see? Continue until all of John can be seen. Note how far away he is. When he is that far away he looks so small that he can be seen through this tiny hole.

Activity 2: Look at a penny held close to the eye. Look at the same penny held by a child at the other side of the room. When does it look bigger? Did the penny change size? Why did it seem to get smaller? (Things look smaller at a distance.)

Activity 3: At night, watch the lights on an airplane grow smaller as the plane gets farther away. (Stars which are really large look small because they are so far away.)

III. BIBLIOGRAPHY

A. THE SUN

1. Freeman The Sun, the Moon, and the Stars. Random, 1960.
2. Gallant, Roy A. Exploring the Sun. Doubleday, Garden City, 1958.
3. Parker, Bertha Golden Book of Science. Golden Books, 1958.
4. Schleine, Miriam Little Red Nose. Abelard-Schuman, 1955.
5. Wyler, Rose My Little Golden Book About the Sky. Simon & Schuster, 1956.

B. THE MOON

1. Bond, Guy, and Theo. & Kate Austin Looking at Science. Teachers Edition. Lyons & Carnahan, 1958.
   pp. 19-22 Good pictures for children to look at.

   Manual pp. 27-28 Good help for the teacher.

2. Craig Science Near You. Teachers Edition. Ginn Co., 1956.
   pp. 53-55 Good pictures of moon in daytime as well as at night.

   Manual p. 106

3. Dowling The New I Wonder Why. Teachers Edition. Winston, 1957.
   pp. 93-94 Good pictures.

4. Frasier-MacCracken We Ask. Singer Science Series, 1955.
   pp. 22-23

   Manual pp. 51-52 Good suggestions for questioning children.

5. Martin, Marcia Tom Corbet: A Trip to the Moon. Wonder Book 1953, 25¢
   Good for motivation. Interesting pictures for use at the library table.

6. Peters, Ann I See the Sky. Wonder Book, 1950, 25¢
   Good for the library corner; shows shapes of moon phases.

C. THE STARS

1. Fenton, Carroll Lane *Worlds in the Sky*. John Day Co., 1950.
2. Frasier, et al. *We Ask*. Singer Science Series, L. W. Singer Co., 1955.
3. Lewellan, John *The True Book of Sun, Moon, and Stars*. Childrens Press, 1954.
4. McCullough, John A. *Dark is Dark*. Young Scott Books, 1947.
5. Wyler, Rose *My Little Golden Book About the Sky*. Simon & Schuster, 1956.

FILMSTRIPS

"Earth and Universe Series", Society for Visual Education, 1952. 7 filmstrips in series.

Constellations 52 frames, black and white.

The Stars and Galaxies 43 frames, black and white.

For discussion purposes only

A SELECTIVE BIBLIOGRAPHY

of

BOOKS FOUND USEFUL

in the

TEACHING OF THE SCIENCE UNITS

for
Kindergarten

Correlated to the Unit Titles as found in
the Reorganized Science Curriculum

Minneapolis Public Schools
Science Department
8-24-64

For discussion purposes only

Kindergarten

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Unit Title	Page	Color
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B. Seeing differences in materials....	4	Pink
C. Water and air around us............	5	Pink
II. Living Things		
A. Things that are alive..............	6	Green
B. How animals are different..........	9	Green
C. Enjoying animals...................	13	Green
D. Plants around us...................	17	Green
III. Energy		
A. Magnets are fun....................	19	Yellow
B. Simple machines....................	20	Yellow
D. Keeping warm.......................	22	Yellow

The annotations for books found on the following pages were obtained from many bibliographies which were consulted in preparation of this list.

Introduction to Science

Science and how we learn about it.	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Bendick, Jeanne. 1951 ALL AROUND YOU ** McGraw $2.96 This book covers weather, time, plants, animals and other things which are started in kindergarten. It is told simply enough for all kindergarten children to understand and offers an excellent beginning for study in these areas.	X	X		X	
Challand, Dr. Helen and Elizabeth Brandt. 1963 SCIENCE ACTIVITIES FROM A TO Z ** Children's Press. $5.50	X		X		
Pacilio, James V. 1963 DISCOVERING SCIENCE THROUGH EXPERIMENTS ** Denison. $3.95	X		X		
Selsam, Millicent E. 1963 GREG'S MICROSCOPE * Harper. $2.19 Greg, who received a microscope, makes slides from common objects around the house and is entranced by what he sees. Accurate information simply presented with a touch of humor for the beginning independent reader.	X		X	X	

* Good
** Excellent

Introduction to Science (continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Van Atta, Frieda E. 1962 HOW TO HELP YOUR CHILD IN GRADE SCHOOL SCIENCE ** Random House. $5.95 Grade-to-grade guide for parents prepared by a teacher.	X	X	X		
Vergara, William C. 1958 SCIENCE IN EVERYDAY THINGS ** Harper $4.95 Answers to hundreds of interesting and scientific questions.	X				

* Good
** Excellent

SCIENCE RESOURCE BOOK BIBLIOGRAPHY - Kdgn.
(Addendum)

Additions to
Page 2

Introduction to Science

Science and how we learn about it.	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Vivian, Charles 1963 SCIENCE GAMES ** Sterling $2.99 Here are 75 amusing, scientific games that youngsters can perform and enjoy by themselves, using simple equipment. They will certainly get a little education as they make the forces of nature perform seemingly impossible tricks. No special equipment or material is needed other than objects which can be found around any house.	X				

* Good
** Excellent

I. The Earth

A. Finding out about our earth	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Carter, Katherine. 1958 THE TRUE BOOK OF OCEANS * Childrens. $2.00 An attractively illustrated book that explains in simple terms many of the oceans' phenomena.	X	X		X	X
Irving, Robert. 1956 ROCKS AND MINERALS AND THE STORY THEY TELL ** Knopf. $3.29 Explains how to examine rocks and decipher their history. Also gives instructions for starting a rock collection.	X				

* Good
** Excellent

I. The Earth

B. Seeing differences in materials	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Carter, Katherine. 1958 THE TRUE BOOK OF OCEANS * Children's Press. $2.00 What an ocean is, its floor, surface, shore, tides, currents, plant and animal life and its usefulness to man are described in simple text.	X	X		X	X
Hurd, Edith Thacher. 1957 IT'S SNOWING ** Sterling. $2.50 This book explains who likes snow and who doesn't; the seasons for snow in simple language; how city and country react to snow and who must work when it snows.	X	X			
Shapp, Martha and Charles. 1961 LET'S FIND OUT WHAT'S LIGHT AND WHAT'S HEAVY ** Watts. $2.50 Vocabulary is simple; concepts are kept simple; illustrations are vivid.	X	X		X	X

* Good
** Excellent

I. The Earth

C. Water and air around us	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Adler, Irving and Ruth. 1962 AIR * Day. $2.29 A first reader about the earth's atmosphere.	X				
Carter, Katherine. 1958 THE TRUE BOOK OF OCEANS * Childrens. $2.00 What an ocean is, its floor, surface, shore, tides, currents, plant and animal life and its usefulness to man are described in simple text.	X	X		X	X
Dickey. 1958 ABOUT RIVERS * Melmont. $2.50 For young readers.	X	X		X	
Graham, Edward H., and William R. VanDersal 1956 WATER FOR AMERICA: THE STORY OF WATER CONSERVATION ** Walck. $3.75 A survey of the principal uses of water and the importance of its conservation.	X				

* Good
** Excellent

SCIENCE RESOURCE BOOK BIBLIOGRAPHY - Kdgn.
(Addendum)

Additions to Page 5

I. The Earth

C. Water and air around us	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Elting, Mary 1964 WATER COME -- WATER GO ** Harvey House $2.50 This easy-to-read, lively book answers boys' and girls' questions about the water system--at home and in the community. The fast-moving text runs along telling where water comes from, how it gets around, where it goes.	X			X	

* Good
** Excellent

II. Living Things

A. Things that are alive	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Barker, Will. 1956 FAMILIAR ANIMALS OF AMERICA ** Harper $4.95 A well-written, authoritative guide to the subject.	X	X			
Fisher, Aileen. 1961 WHERE DOES EVERYONE GO? Crowell. $3.36 The facts in this book are put in rhyme and the accompanying pictures are beautiful. The language is easily comprehended. It is an excellent book for fall use.	X	X		X	X
Frost, Frances. THE LITTLE NATURALIST ** Whittlesey House. $2.63 The poems in this book are about animals familiar to the children. Each poem is short and excellently done.	X	X		X	X
George, Jean. 1957 THE HOLE IN THE TREE * Dutton. $2.75 This book is excellent in that it covers all animals who might use a tree. Parts are much too difficult for the kindergarten child to comprehend. It is definitely too long for one sitting, but could be used in part for certain animals.	X			X	

* Good
** Excellent

II. Living Things - A. (continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Jordan, E. L. 1952 HAMMOND'S NATURE ATLAS OF AMERICA ** Hammond $4.95 Information on the plants and animals to be found in this country.	X	X			
Podendorf, Illa. 1956 THE TRUE BOOK OF ANIMALS OF THE SEA AND SHORE ** Children's Press. $2.00 Includes animals with fur, fins, many legs, shells, sharp spines, and soft bodies. Large colorful pictures supplement the text.	X	X		X	X
Politi, Leo. 1957 THE BUTTERFLIES COME ** Scribner. $3.12 Stephen and Lucia are children who live on Monterey Peninsula in Calif., where every year, in the fall, thousands of Monarch butterflies come to spend the winter. The information about Monarch butterflies is accurate. The lovely illustrations add interest to the story.	X			X	
Selsam, Millicent E. 1962 TERRY AND THE CATERPILLARS ** Harpers. $2.19 The text and pictures make the caterpillar-to-cocoon-to-moth process so interesting that the young reader will want to bring up the next caterpillar he finds, and so clear that he will know how to do it.	X	X		X	

* Good
** Excellent

II. Living Things - A. (Continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Wyler, Rose. 1957 THE GOLDEN PICTURE BOOK OF SCIENCE ** Simon & Schuster. Out-of-print This book covers almost all areas of the kindergarten curriculum. It covers them on 2-3 pages in simple language. It also covers some simple experiments which can be done with the topics.	X	X		X	
Zim, Herbert. 1950 FROGS AND TOADS ** Morrow. $2.78 An elementary introduction.	X				
Zion, Gene. 1956 REALLY SPRING ** Harpers, unpaged, illus., 1956 $3.27 The vocabulary is simple; the pictures lovely, yet it gets across the point very well that even though the calendar says it is spring, it may not really be.		X		X	X

* Good
** Excellent

II. Living Things

B. How animals are different.	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Allen, Gertrude E. 1946 EVERYDAY ANIMALS ** Houghton. $2.57 The author of "Everyday Birds" has provided a companion volume in this easy-to-read description of the characteristics and habits of the cottontail rabbit, chipmunk, white-footed mouse, skunk, porcupine and gray squirrel. Accurate drawings are attractive.	X	X		X	
Ballard, Lois. 1957 THE TRUE BOOK OF REPTILES ** Children's Press. $2.00 Four types of reptiles are described - Reptiles with Shells on Their Backs, Reptiles with Four Legs that Live on Land, Reptiles with Four Legs that Live in Water, and Reptiles with no Legs. Many clear pictures illustrate the easy-to-read text.	X	X		X	
Barker, Will. 1956 FAMILIAR ANIMALS OF AMERICA ** Harper. $5.11 A well-written, authoritative guide to the subject.	X	X			

* Good
** Excellent

II. Living Things - B. (continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Bronson, Wilfrid S. 1946 COYOTES ** Harcourt. $2.75 The story of how these animals live.	X	X		X	X
Darby, Gene. 1957 WHAT IS A FROG? ** Benefic Press. $1.80 The frog is an animal all children are familiar with and this book explains about its "childhood" and transformation from a tadpole simply, yet fully.	X	X		X	
Eberle, Irmengarde. 1958 ROBINS ON THE WINDOW SILL ** Crowell. $3.20 This book shows the life of robins in the nest as a family -- can lead to detailed study or just casual study of birds. Definitely fulfills objectives stated in curriculum guide.	X	X		X	X
Hogner, Dorothy Childs. 1960 GRASSHOPPERS AND CRICKETS ** Crowell. $2.90 A thorough introduction to two important insects which provides basic knowledge.	X	X		X	

* Good
** Excellent

II. Living Things - B. (continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Jordan, E. L. 1952 HAMMOND'S NATURE ATLAS ** Hammond. $4.95 Information on the plants and animals to be found in this country.	X	X			
Podendorf, Illa. 1956 THE TRUE BOOK OF ANIMALS OF THE SEA AND SHORE ** Children's Press. $2.00 Includes animals with fur, fins, many legs, shells, sharp spines, and soft bodies. Large colorful pictures supplement the text.	X	X		X	X
Weil, Ann. 1956 ANIMAL FAMILIES ** Children's Press. $2.50 A very simple introduction to families, with emphasis on the ordinary name of the male, female and young.		X		X	
Zim, Herbert S. 1952 ALLIGATORS AND CROCODILES * Morrow. $2.78 Distinguishes between alligators and crocodiles, and describes the geographic distribution, habitat, and food of each.	X				

* Good
** Excellent

II. Living Things - B. (continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Zim, Herbert S. 1946 ELEPHANTS * Morrow. $2.78 An interesting study of the animal.	X	X		X	
Zim, Herbert S. 1951 THE GREAT WHALES * Morrow. $2.78 The basic facts about whales are good and of interest to a kindergartener, but not the book as a whole.	X	X			
Zim, Herbert S. 1950 FROGS AND TOADS ** Morrow. $2.78 An elementary introduction.	X				
Zim, Herbert S. 1949 SNAKES * Morrow. $2.78 The book discusses reproduction processes of snakes (some similar to man's) and parts of anatomy of snakes. Parts are good -- snakes have enemies besides man and snakes help us. Vocabulary is quite advanced.	X	X		X	

* Good
** Excellent

SCIENCE RESOURCE BOOK BIBLIOGRAPHY - Kdgn.
(Addendum)

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II. Living Things

B. How animals are different.	Tchr. Ref.	Illus.	Learning Activities	Read to Childr	Child Use
Mason, George F. 1947 ANIMAL HOMES ** Morrow $2.78 A survey of some of the many unusual homes which animals occupy.	X	X			
Tannenbaum, Harold and Stillmen, Nathan 1960 ANIMALS AND WHERE THEY LIVE * Webster 69¢ This book contains simple, but accurate information about a number of animals and their habitats. The vocabulary is very simple and the pictures are colorful.	X	X		X	X

* Good
** Excellent

II. Living Things

C. Enjoying Animals	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Allen, Gertrude E. 1946 EVERYDAY ANIMALS ** Houghton. $2.57 The author of "Everyday Birds" has provided a companion volume in this easy-to-read description of the characteristics and habits of the cottontail rabbit, chipmunk, white-footed mouse, skunk, porcupine and gray squirrel. Accurate drawings are attractive.	X	X		X	
Castle, Jane. 1959 PEEP-LO ** Holiday. $2.50 A book about a little girl who finds a plover's nest and watches and young birds hatch from the eggs. A book with attractive illustrations for beginning readers.	X	X		X	X
Fenton, Carroll Lane and Pallas, Dorothy. 1959 OLIVER PETE IS A BIRD ** Day. $2.86 This book is divided into topics which allows the teacher to get as specific or stay as general as she wants to in a study of birds.	X	X		X	X

* Good
** Excellent

II. Living Things - C. (continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Flothe, Louise Lee. 1957 THE FARMER AND HIS COWS ** Scribner. $3.25 Young children will enjoy this excellent comparison of dairy farming "then and now." Large colorful illustrations make up the major portion of this book.	X	X		X	
Goudey, Alice E. 1958 HERE COME THE WILD DOGS * Scribner. $2.75 The habits and behavior of the red fox are described in a story of a particular fox family. Attractively illustrated.	X	X		X	X
Henry, Marguerite. 1955 WAGGING TAILS - AN ALBUM OF DOGS ** Rand. $2.95 This book is a collection of stories of all types of dogs. Each one can be read separately and is complete in itself.	X	X		X	X

* Good
** Excellent

II. Living Things - C. (continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Lubell, Winifred, and Cecil Lubell. 1960 THE TALL GRASS ZOO ** Rand McNally. $2.95 This book covers all insects found in the back yard. It can easily be read in several sittings. Insects covered are common enough for all children to know them.	X	X		X	
Ozone, Lucy and Hawkinson, John. 1955 WINTER TREE BIRDS ** Whitman. $2.00 The chickadee, tufted titmouse, white-breasted nuthatch and brown creeper are described and pictured in color. A good elementary reference for an area where these birds are winter residents.	X	X		X	
Podendorf, Illa. 1956 THE TRUE BOOK OF ANIMALS OF THE SEA AND SHORE ** Children's Press. $2.00 Includes animals with fur, fins, many legs, shells, sharp spines, and soft bodies. Large colorful pictures supplement the text.	X	X		X	X
Savitt, Sam. 1956 STEP-A-BIT - A STORY OF A FOAL * Dutton. $2.95 Pencil drawings record the events in the life of a filly from birth to the time she is taken from her mother.	X			X	

* Good
** Excellent

II. Living Things - C. (continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Sootin, Laura. 1959 LET'S GO TO A ZOO * Putnam. $1.86 How the animals are housed, displayed, fed and otherwise cared for. Emphasizes the operation of a zoo rather than the many different types of animals displayed.	X			X	
Weil, Ann. 1956 ANIMAL FAMILIES ** Children's Press. $2.50 Full-page color pictures of chickens, horses, cows, sheep, dogs, goats, donkeys, pigs, geese, ducks, turkeys, and rabbits, with brief descriptive text. May also be used with preschool children. Reinforced binding.	X	X		X	X

* Good
** Excellent

II. Living Things

D. Plants around us	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Brown, Ann Torson. 1958 HOW DOES A GARDEN GROW * Dutton. $2.50 Two children choose seeds, layout a garden plan, prepare and plant flats, thin and transplant, prepare outdoor soil and care for a garden through the season.	X	X			X
Jordan, E. L. 1952 HAMMOND'S NATURE ATLAS OF AMERICA ** Hammond. $4.95 Information on the plants and animals to be found in this country.	X	X			
Peattie, Donald Culross. 1957 THE RAINBOW BOOK OF NATURE * World. $4.95 This sourcebook covers all areas of nature and gives, clearly and in simple terms, information all children are interested in.	X		X		
Selsam, Millicent. 1958 SEE THROUGH THE LAKE * Harper. $2.92 Exploration of the community of plants and animals that live at different levels in a lake.	X				

* Good
** Excellent

II. Living Things - D. (Continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Udry, Janice May. 1956 A TREE IS NICE ** Harper. $2.73 A picture book that might help develop desirable attitudes and greater appreciation for trees. The bright full-page paintings of Marc Simont add to the book's charm.		X		X	
Zim, Herbert S., and Alexander C. Martin. 1950 FLOWERS: A GUIDE TO FAMILIAR AMERICAN WILDFLOWERS ** Simon & Schuster. $2.99 (paper - $1.00) A well-organized handbook giving species of flowers, their characteristics, and regional maps.	X	X			X
Zim, Herbert S., and Alexander C. Martin. 1956 TREES: A GUIDE TO FAMILIAR AMERICAN TREES ** Simon & Schuster. $2.99 (paper - $1.00) A clear and thorough handbook for anyone interested in trees.		X			

* Good
** Excellent

III. Energy

A. Magnets are fun	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Branley, Franklyn M., and Eleanor K. Vaughan. 1956 MICKEY'S MAGNET ** Crowell. $2.69 This book explains very simply the properties of a magnet and why it can pick some things up. It covers a topic young children are very much interested in and it is a difficult one for a teacher to explain simply. A marvelous book for use in this area.	X	X	X	X	X
Pine, Tillie S. and Levine, Joseph. 1958 MAGNETS AND HOW TO USE THEM ** Whittlesey. $2.63 Many diagrams help to explain the characteristics and uses made of various types of magnets.	X		X	X	X
Reuben, Gabriel H. and Archer, Gloria. 1959 WHAT IS A MAGNET? * Benefic. $1.80 Easily understood material covering the basic ideas of magnetism.	X				

* Good
** Excellent

III. Energy

B. Simple Machines	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Colby, Jean Poindexter. 1960 TEAR DOWN TO BUILD UP: THE STORY OF BUILDING WRECKING * Hastings House. $2.95 Informs boys and girls about the methods of demolition used in the wrecking jobs they see in city streets.	X	X			
Darby, Gene. 1961 WHAT IS A SIMPLE MACHINE? ** Benefic. $1.80 The text and drawings explain how levers, wheels, pulleys, inclined planes, screws and wedges help man do work. Has a vocabulary of 120 words exclusive of labels and drawings.	X				
Hoban, Russell. 1959 WHAT DOES IT DO & HOW DOES IT WORK: POWER SHOVEL, DUMP TRUCK AND OTHER HEAVY MACHINES. * Harper. $3.27 A picture book for boys.	X			X	
Shapp, Martha and Charles LET'S FIND OUT ABOUT WHEELS ** Watts. $2.50 This book gives the history of and shows the uses for many kinds of wheels. Very simply written.		X		X	X

* Good
** Excellent

III. Energy - B. (continued)	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Sharp, Elizabeth N. 1959 SIMPLE MACHINES AND HOW THEY WORK ** Random House. $2.19 Primary level reading about what the physicist calls simple machines, such as wheels and axles, wedges and screws, with simple experiments.	X	X	X	X	
Zion, Gene and Graham, Margaret Bloy. 1951 ALL FALLING DOWN ** Harper. $2.92 This book explains simply, with beautiful pictures, how everything falls. Excellent beginning for study of gravity at kindergarten level.		X	X	X	X

* Good
** Excellent

III. Energy

D. Keeping warm	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Branley, Franklyn M. 1961 THE SUN, OUR NEAREST STAR ** Crowell. $2.35 Three-color illustrations and clarity to this "Let's-read-and-find-out" explanation of what the sun is and of our dependence upon it.				X	
Goudey, Alice E. 1961 THE DAY WE SAW THE SUN COME UP ** Scribner. $3.12 Present facts about the earth and sun in the traditional picture book format, using rhythmic prose for the text. A good book for free reading.	X	X		X	

* Good
** Excellent

SCIENCE RESOURCE BOOK BIBLIOGRAPHY - Kdgn.
(Addendum)

Additions to
Page 22

III Energy

D. Keeping warm	Tchr. Ref.	Illus.	Learning Activities	Read to Children	Child Use
Tannenbaum, Harold and Stillmen, Nathan 1960 FIRE AND HOW IT IS USED ** Webster 69¢ This book contains a concise explanation of fire, its uses and control. A good resource for teaching fire safety.	X	X		y	X

* Good
** Excellent

Kindergarten

BASIC SCIENCE EDUCATION SERIES
Published by Row, Peterson & Co.

(Grade Placed for Major Topic in the Reorganized Science Curriculum)

II. Living Things

C. Enjoying animals

	Reading Level
The Pet Show	3.2

JLP/db
10/18/67

For discussion purposes only

A PARTIAL LISTING OF PRESENTLY OWNED

SCIENCE MOTION PICTURE FILMS

KINDERGARTEN

Correlated to the Unit Titles as found in the
Reorganized Science Curriculum

Minneapolis Public Schools
Science Department
3-17-1965

For discussion purposes only   Kindergarten

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The annotations for films found on the following pages were obtained in most cases from the Library of Congress cards. Some annotations were secured from other sources such as the Educational Film Guide and producers' catalogs.

Introduction to Science

Science and how we learn about it

Name and Description of Film	Other Grade Placements	Remarks
1. **Children in Winter** * EBF, 1958; 11 min. Two children enjoy winter scenes and activities playing in the snow with their dog, investigating nature in their backyard and around the house, checking the temperature, and observing the waning of the day with its accompanying play of shadows.	Gr. 3 - **	
2. **Our World of Science** ** EBF, 1956; 10 min. Introduces and defines the words "science" and "experiment", and demonstrates a simple experiment. Develops the idea of an orderly universe and shows a working procedure for problem solving in science.	Gr. 3 - **	
3. **Spring is An Adventure** * Coronet, 1955; 11 min., black & white Through the eyes of Mary Ann, many of the wonders of spring are revealed. Flowers and trees develop from buds to full bloom. Changeable weather includes much mud and rain. Bees gather nectar, birds build nests, robin lays eggs, and people clean house, repair screens, work in gardens, and fly kites. Trip along stream shows spring activities of animals, tadpoles, turtles, and plants. Concludes with fishing trip.	Gr. 1 - **	

* Good
** Excellent

Introduction to Science (continued)

Name and Description of Film	Other Grade Placements	Remarks
4. Ways to Find Out ** Churchill-Wexler, 1957; 12 min., color Vino, a boy of about 8 years, discovers that there are many ways to learn about things. Walking home in the rain, he sees, hears, feels, tastes, and smells many things. At home he distinguishes between things, such as a ball and an apple, by using his senses. Vino shows that he can find out many things by using only one sense. He can sense a kitten by its sound, a rug by its feel, soap and pickles by their smell, and an orange by its taste.	Gr. 1 - ** Gr. 3 - ** K -	Also listed I-B
5. What the Frost Does: Background for Reading and Expression ** Coronet, 1960; 10 min., color In guiding children to make observations of events in nature, the film shows seasonal changes and the effects of frost in an engaging story of a boy and his interest in a pumpkin that is growing in his father's field.	Gr. 1 - ** Gr. 3 - **	Show in fall
6. Prove it with a Magnifying Glass ** Film Assoc. of Calif., ;11 min., color This film is designed as an introduction to the scientific method. This film was made for the young child. It uses a child's first science experiences with a simple instrument (the magnifying glass) to illustrate the concept: prove it yourself. For primary science classes.	Gr. 1 - ** Gr. 2 - ** Gr. 3 - **	

* Good
** Excellent

I. Earth

A. Finding out about our earth

Name and Description of Film	Other Grade Placements	Remarks
1. Big World ** Educational Horizons, 1960; 11 min., color Shows how we cannot always know the shape of an object by viewing only a small part of it. Answers the simple, direct questions of a child about the size, and shape, of our globe. A primary globe is used by the child's father to discuss briefly the basic forms of land and water.	Gr. 1 - * Gr. 3 - ** Gr. 5 - *	 First semester Easy film

* Good
** Excellent

I. Earth

B. Seeing differences in materials

Name and Description of Film	Other Grade Placements	Remarks
1. Air All Around Us ** Young Amer[illegible], 1948; 10 min., black & white Explains the properties of air by demonstrating that air is a substance which exerts pressure, expands and contracts, and can be compressed.	Gr. 4 - ** Gr. 6 - * Gr. 7 - **	Advanced
2. Ways to Find Out ** Churchill-Wexler, 1957; 12 min., color Vino, a boy of about 8 years, discovers that there are many ways to learn about things. Walking home in the rain, he sees, hears, feels, tastes, and smells many things. At home he distinguishes between things, such as a ball and an apple, by using his senses. Vino shows that he can find out many things by using only one sense. He can sense a kitten by its sound, a rug by its feel, soap and pickles by their smell, and an orange by its taste.	Gr. 1 - ** Gr. 3 - **	Also listed Intro.

* Good
** Excellent

II. Living Things

A. Things that are alive

Name and Description of Film	Other Grade Placements	Remarks
1. Fall Brings Changes ** Churchill-Wexler, 1962; 11 min., color Shows the adaptation of plants and animals to colder weather. Useful in the area of language arts. It is beautiful and poetic and will inspire many stories to enrich the children's imagination and vocabulary.	Gr. 1 - ** Gr. 2 - ** Gr. 4 - **	
2. Judy Learns About Milk ** Young America, 1948; 10 min., black & white Judy visits her Uncle George's farm and finds out how man gets milk from cows. She watches the workers on the farm cultivate corn and cut hay for the cows to eat; she observes the care and feeding of the cows, and after seeing a man milk a cow, she also tried her hand at milking. At the end the fresh milk is shipped to a dairy plant.		
3. Living and Growing ** Churchill-Wexler, 1957; 11 min. Depicts what it means to "live and grow". As we watch Beano, Wendy, and their pets, the narrator explains that they all need food, shelter, and sleep. He points out the difference between things that are alive and those that are not. Correlated with the Heath Elementary Science textbook series.	Gr. 2 - *	Also listed II-E

* Good
** Excellent

II. Living Things - A. (continued)

Name and Description of Film	Other Grade Placements	Remarks
4. Spring Brings Changes ** Churchill-Wexler, 1962; 11 min., color In spring when the sun warms the earth, the world comes alive. Farmers plow their fields and Faith and Mark plant a vegetable garden. Beautiful nature photography compresses in time a wealth of changes in plants and animals, changes that occur so gradually that they are difficult for the child to grasp.	Gr. 2 - ** Gr. 4 - **	
5. Spring on the Farm ** EBF, 1947; 11 min., color Joan and Jerry watch the developments that take place in plant and animal life as spring returns to the farm.	Gr. 4 - *	
6. Summer on the Farm ** EBF, 1947; 11 min., color Joan and Jerry take part in summer activities on the farm. Shows seasonal changes and rapid growth of plants and animals during the summer months		
7. Uncle Jim's Dairy Farm ** Atlas, 1948; 11 min., color (Nat'l Dairy Council) Daily living on a dairy farm. Shows the adventures of two city children who spend the summer on a farm observing the growth of plants and animals. Discusses the factors affecting the growth and development of the children themselves--food, rest, exercise.		Also listed II-E

* Good
** Excellent

II. Living Things - A. (continued)

Name and Description of Film	Other Grade Placements	Remarks
8. What Plants Need for Growth ** EBF, 1960; 10 min., color Uses time-lapse photography to indicate by means of simple demonstrations the factors required for plant growth, including water, light, minerals, air and warmth. Time-lapse photography is used to compare plant growth under favorable and unfavorable circumstances.	Gr. 2 - ** Gr. 4 - *	
9. Winter on the Farm ** EBF, 1948; 11 min., color Shows how Joan and Jerry spend the winter months on the farm.	Gr. 4 - **	

* Good
** Excellent

II. Living Things

B. How animals are different

Name and Description of Film	Other Grade Placements	Remarks
1. Adventures of Bunny Rabbit ** EBF, 1937; 10 min., black & white Portrays the life of a family of rabbits. Relates the adventures of young Bunny who, visiting a nearby farm in search of lettuce, encounters a frog, a squirrel, some cows, baby chickens, and other barnyard animals.	Gr. 2 - *	
2. Andy's Animal Alphabet ** McGraw-Hill, 1950, 10 min., color Shows Andy, the Zoo's little orangutan, on a guided tour through the Bronx Zoo, visiting a series of familiar and strange animals whose names begin with different letters of the alphabet.	Gr. 3 - *	
3. Animals of Alaska ** . Northern Films, 1958; 11 min., color Shows views of typical wild animals of Alaska, including the Dall sheep, mountain goat, bear, moose, pika, ground squirrel, hoary marmot, porcupine, red fox, seal, sea lion, walrus, caribou, bison, and musk ox. Includes maps showing the habitat of each.	Gr. 4 - * Gr. 5 - **	
4. Animals - Ways They Move ** EBF, 1956; 11 min., color Close-up, slow-motion, and fast-motion photography is used in showing how animals move in water, on land, and in the air. Explains that animal's movement helps it to acquire food, to protect itself from enemies, to find a home, to move from place to place, and to adapt to its environment.	Gr. 4 - ** Gr. 7 - **	

* Good
** Excellent

II. Living Things - B. (continued)

Name and Description of Film	Other Grade Placements	Remarks
5. Billy and Nanny, the Goat Twins ** EBF, 1953, 11 min., black & white Describes the characteristics of domesticated goats and milking and feeding of goats on a farm. Shows the playful antics of two young goats.		
6. Bird Homes ** EBF, 1930; 10 min., black & white Shows the beach and marsh homes of least tern, killdeer, stilt, gull, pied-billed grebe, etc.; the meadow homes of the bobolink, spotted sandpiper, horned lark, meadow lark and burrowing owl; the sky-scraper homes of cormorants, puffins, duck hawks, flickers, etc.; and the homes of birds which build near the ground, such as the cuckoo, wood thrush, yellow warbler, red-start, and hummingbird.	Gr. 2 - * Gr. 4 - *	
7. Birds: How We Identify Them ** Coronet, 1960: 11 min., color Follows two boys who, with field glasses and bird guide book, set out to look for birds. Shows how to distinguish one bird from another; by appearance; by sounds they make; and by their actions, both on the ground and in the air. Points out the identifying characteristics of many of the more common birds, showing them in their natural habitat.	Gr. 2 - ** Gr. 5 - **	

* Good
** Excellent

II. Living Things - B. (continued)

Name and Description of Film	Other Grade Placement	Remarks
8. Birds of Our Storybooks ** Coronet, 1954; 12½ min., color Scenes of birds in their natural habitats and in book illustrations describe the nesting, feeding, song, color and song characteristics of a number of common birds. Interest is enhanced with poems and suggested activities such as finding and telling stories about birds and drawing pictures. Birds described are the robin, cardinal, crow, owl, sparrow, blue jay, redheaded woodpecker, wren, and sea gull.	Gr. 3 - **	
9. Birds of the Dooryard ** Coronet, 1954; 11 min., color Presents birds which build their nests in gardens and near homes--robins, yellow warblers, eastern phoebes, yellow-shafted flickers, cardinals, swallows, house wrens, and purple martins. Describes the differences among these birds, their ways of protecting their nests and feeding their young, and ways in which they can be encouraged to nest around houses.	Gr. 2 - ** Gr. 3 - ** Gr. 5 - ** Gr. 7 - **	K - Adv. vocab.
10. Birds of the Seashore ** EBF, 1951; 11 min., color Portrays the activities, habitats and distinguishing marks of various North American water birds. Depicts gulls in flight and nesting in colonies; gannet colonies on Bonaventure Island; eider ducks in the St. Lawrence Estuary; and the black guillemot, blue heron, razor-billed auk, and cormorant. Includes bird calls.	Gr. 3 - ** Gr. 5 - * Gr. 7 - *	

* Good
** Excellent

II. Living Things - B. (continued)

Name and Description of Film	Other Grade Placements	Remarks
11. **Chameleon** ** International, 1959; 8 min., color The characteristics and habits of the chameleon are depicted in color and with extreme close-ups to demonstrate details of the feet and eyes. The chameleon is seen in its normal habitat, camouflaged against the leaves, moving about the branches. Some remarkable scenes show the color changes of the skin in response to light changes and temperament. The independent action of the eyes is then dealt with and finally the chameleon is seen catching insects with its elastic tongue, in normal and slow motion.	Gr. 4 - ** Gr. 10 - *	
12. **Common Animals of the Woods** ** EBF, 1943; 11 min., black & white Presents a study of various common animals in their natural habitat. Gives information as to appearance, size, adaptiveness, habitat, habits, and care of the young, for such animals as the squirrel, rabbit, raccoon, porcupine, otter, mink, beaver, opossum, skunk, and woodchuck.	Gr. 2 - ** Gr. 7 - *	
13. **Corky the Crow** ** EBF, 1960; 10 min., color A study of the crow, showing the crow's nest with the eggs, the hatched young crows, and finally the fledglings after they leave the nest. Shows the antics of Corky, the most adventurous of the fledglings, who is trapped by a farmer's children and becomes their pet.		Also listed II-C

* Good
** Excellent

II. Living Things - B. (continued)

Name and Description of Film	Other Grade Placements	Remarks
14. Elephants ** EBF, 1940; 11 min., black & white Portrays the characteristics and training of domesticated elephants, describing the animal's physical features, food, and methods of eating, drinking and bathing. Shows an adult elephant performing for a circus buyer and young elephants learning to stand on their front and hind legs, to sit on barrels, to walk planks, to ring bells, and to obey other commands.	Gr. 3 - *	
15. Farm Animals ** EBF, 1937, 11 min., black and white Follows Farmer Brown in typical daily activities as he cares for his cows, horses, pigs, sheep and goats. Shows him feeding his pigs and shearing his sheep. Includes scenes of newborn calves, colts, lambs and kids. Reproduces sounds of all the animals depicted.	Gr. 2 - ** Gr. 4 - **	Easy film
16. Farm Babies and Their Mothers ** Film Assoc. of Calif. 1962; 10 min., color Introduces seven different farm animal babies and their mothers, challenging the child to name both mothers and babies. Among the animals shown are a cow, lamb, sow, mare, hen, cat and dog. Describes each animal's habits and economic importance.		

* Good
** Excellent

II. Living Things - B. (continued)

Name and Description of Film	Other Grade Placements	Remarks
17. Farmyard Babies ** Coronet, 1952; 11 min., color First and second grade teachers use posters and models of farm buildings as an introduction to a study of farm life. Pictures of a farm in spring show a variety of young animals and portray their characteristics, habits and eventual usefulness to the farmer.	Gr. 2 - ** Gr. 4 - **	
18. Poultry on the Farm ** EBF, 1960; 11 min., color Explains how different kinds of poultry live on a typical small farm. Shows chickens, geese, ducks, and turkeys at different ages in their natural environment. Follows the development of a chick embryo and the hatching of a chick. Includes review questions.	Gr. 2 - ** Gr. 5 - **	
19. Rikki, the Baby Monkey ** EBF, 1949; 11 min., black & white Shows the life of a baby Rhesus monkey in five sequences: Rikki and his family, Rikki has breakfast, Rikki finds a playmate, Rikki has an adventure, Rikki returns home.	Gr. 2 - **	
20. The Robin ** Heidenkamp, 1946; 10 min., color Depicts the life story of the robin from the time it arrives in the North in early spring. Shows nest building, eggs in the nest, feeding and care of the young, preening of feathers, etc.	K - Gr. 2 - * Gr. 3 - * Gr. 5 - **	Must do own narration Diff. Vocabulary

* Good
** Excellent

II. Living Things - B. (continued)

Name and Description of Film	Other Grade Placements	Remarks
21. Snails: Backyard Science ** Film Assoc. of Calif., ; 11 min., color By looking closely at a common backyard snail, we discover for ourselves many interesting things about it. It moves slowly and will not harm us. It lives in damp and shady places. The snail has two pairs of stalks on its head, with eyes at the end of the longer pair. It has a shell which helps protect its soft, moist body from drying out. From snails we can learn much about the world of nature.		
22. Spotty: Story of a Fawn ** Coronet, 1950; 11 min. The adventures of Spotty, a wild fawn, as he discovers other animals in the forest. Includes devices for classroom participation.	Gr. 3 - ** Gr. 4 - **	
23. Wooly The Lamb ** Coronet, 1956; 11 min., color Begins by showing many farm animals and then giving their natural sounds. Then in the sheep pasture a new-born lamb is seen feeding. A story is then told of how the lamb, desiring a playmate, escapes from the pastures, visits other animal groups on the farm, is returned to the pasture by the farm dog, and there finds a playmate, another new-born lamb.		
24. Wonders in the Desert ** Churchill-Wexler, 1960; 10 min., color Joan and Jimmy, elementary grade pupils, discover many forms of animal life existing in the desert. During a walk they see jackrabbits and burros and examine closely an ordinary lizard, a horned toad, a chuckwalla, a desert tortoise, and a pocket mouse. The narrator points out how these animals gain protection and adapt themselves to desert life.	Gr. 2 - ** Gr. 4 - **	

* Good
** Excellent

SCIENCE MOTION PICTURE FILMS - Kindergarten
(Addendum)

Additions to
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II. Living Things

B. How animals are different

Name and Description of Film	Other Grade Placements	Remarks
Animals Move In Many Ways ** Film Assoc. of Calif., 1957; 11 min., color Illustrates a few of the many different ways in which living things move about. For science and language arts.	Gr. 2 - **	
Living Things Are Everywhere ** EBF (Basic Life Science) 1964; 11 min., color There are many different kinds of living things. Some are animals and some are plants. Some are large, and some are so small that they are difficult to see. Wherever you are, you can find living things if you look very closely. You can find them in water, in the air, on the ground, and underground. Living things move about in different ways. Some can run or crawl on the ground; some can climb trees; some can swim; and some can fly. All plants and animals must live in places where they can get the kind of food they need.	Gr. 1 - ** Gr. 2 - **	
Looking At Birds ** EBF (Basic Life Science) 1964; 10 min., color Illustrates some of the ways in which birds differ from other animals--in appearance, body structure and functions, and behavior. Shows some of the special ways in which birds are adapted to the environments in which they live.	Gr. 2 - **	

* Good
** Excellent
5-9-67

SCIENCE MOTION PICTURE FILMS - Kindergarten
(Addendum)

Additions to
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II. Living Things - B. (continued)

Name and Description of Film	Other Grade Placements	Remarks
The Red Hen ** BAR; 1963; 11 min., color Tells the story of a red hen who leaves the other chickens and secretly goes to a nest under a hedge, where she has hidden many eggs. Shows the hen watching the baby chicks after three weeks of sitting, teaching them to drink, to scratch for food, enjoying a dust bath. Concludes by showing the hen leading the chicks back to her own yard.	Gr. 2 -	No eval. yet

* Good
** Excellent
5-9-67

II. Living Things - B. (continued)

Name and Description of Film	Other Grade Placements	Remarks
25. Wonders In Your Own Backyard ** Churchill-Wexler, 1949; 10 min., color A boy and a girl find in their urban backyard an earthworm, a millepede, a sow bug, a pillbug, a house spider and a snail. Close-up views show details as to how they move and eat.	Gr. 2 - ** Gr. 4 - **	
26. Zoo ** EBF, 1949; 11 min., color A visit to the Chicago Zoological Park, showing some of the animals found there, their characteristics, their unique coloration and their feeding habits.	Gr. 1 - ** Gr. 3 - **	
27. Zoo Animals of Our Storybooks: Background for Reading and Expression ** Coronet, 1953; 10 min. Pictures a variety of animals in the zoo.	Gr. 1 - ** Gr. 3 - *	
28. Zoo Baby Animals ** EBF, 1960; 11 min., color Through this film, children have an opportunity to look "behind the scenes" at the zoo -- to see activities in the kitchen and hospital; to see how baby animals are fed and cared for by their keepers. The film also shows many animals in attractive outdoor settings and in "children's zoo" sections in the famous Lincoln Park and Brookfield Zoos of Chicago.	Gr. 1 - ** Gr. 3 - *	

* Good
** Excellent

II. Living Things

C. Enjoying animals

Name and Description of Film	Other Grade Placements	Remarks
1. Care of Pets ** EBF, 1944; 11 min., black & white Demonstrates, by means of dramatized situations, the care of various common household pets. Considers the requirements of canaries, tropical fish, cats and dogs, and explains the necessity for proper food, cleanliness, grooming and training. Depicts children caring for their pets at home, and stresses the idea that proper care makes for healthy, happy pets.	Gr. 3 - **	
2. Corky the Crow ** EBF, 1960; 10 min. A study of the crow, showing the crow's nest with eggs, the hatched young crows, and finally the fledglings after they leave the nest. Shows the antics of Corky, the most adventurous of the fledglings, who is trapped by a farmer's children and becomes their pet.		Also listed II-B
3. Hoppy, The Bunny ** Coronet, 1959; 11 min., color Pictures a class of children reading about a rabbit and then uses live animals to depict the bunny's travels, meeting his friends, the raccoon and the owl, and facing life on a farm. Shows the rabbit meeting other farm animals, then being chased home by a dog. Ends showing children sketching pictures about the story.		

* Good
** Excellent

II. Living Things - C. (continued)

Name and Description of Film	Other Grade Placements	Remarks
4. The Turtle: Care of a Pet ** 6 min., color, $100; b/w, $50 Film Associates of California This film is designed for kindergarten-primary grades. As the film explores the natural way of life of a little red-eared turtle, the child learns how to care for a turtle pet, and gains a better understanding of how to care for any animal pet.		
4. Yours For a Song ** Roy Wilcox, 1954; 22 min., black & white Shows a backyard bird sanctuary in Berlin, Conn., which was established to attract migrating and resident birds throughout the year. Explains that birds are attracted to yards and gardens if they are provided with food, water and shelter. Includes views of 24 different species of birds.	Gr. 3 - ** Gr. 5 - **	

* Good
** Excellent

II. Living Things

D. Plants around us

Name and Description of Film	Other Grade Placements	Remarks
1. Learning About Flowers * EBF, 1958; 10 min., color Portrays in vivid photography the story that there are many kinds of flowering plants. Time-lapse photography is extensively used to show the opening of some of the more common flowers of our fields and gardens. The film is designed to help the student appreciate the beauty in flowers and to realize that the purpose of the flower is to produce seeds.	Gr. 1 - ** Gr. 3 - ** Gr. 5 - **	
2. Learning About Seeds ** EBF, 1961; 11 min., color Explains that there are many different kinds of seed bearing plants and that seeds have many sizes, shapes, and colors. Through time-lapse photography we see how seeds grow and what they need for growth. Several methods of seed dispersal are also clearly illustrated.	Gr. 1 - ** Gr. 3 - ** Gr. 5 - **	
3. What Plants Need For Growth ** EBF, 1960; 10 min., color Uses time-lapse photography to indicate by means of simple demonstrations the factors required for plant growth, including water, light, minerals, air and warmth. Time-lapse photography is used to compare plant growth under favorable and unfavorable circumstances.	Gr. 2 - ** Gr. 4 - *	

* Good
** Excellent

SCIENCE MOTION PICTURE FILMS - Kindergarten
(Addendum)

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II. Living Things

D. Plants around us

Name and Description of Film	Other Grade Placements	Remarks
Foods from Grain Coronet; 1962; 11 min., color Presents the variety of foods which come from grains. Describes the conditions under which grains are grown. Shows how breads and cereals are made from grain. Emphasizes the place of these foods in the daily diet.		No eval. yet

* Good
** Excellent
5-9-67

II. Living Things

E. What our bodies need

Name and Description of Film	Other Grade Placements	Remarks
1. Care of the Hair and Nails ** EBF, 1951; 11 min., black & white A fairy tale character uses magic to help children learn good habits. She shows them how to clean and manicure fingernails, how to trim toenails, and how to shampoo and brush the hair. She lets them see some common diseases of the hair, and through animated drawings, shows the structure of hair and nails and explains why their care is important.	Gr. 1 - ** Gr. 5 - **	
2. Care of the Skin ** EBF, 1949; 11 min., black & white Demonstrates good habits of skin hygiene and illustrates common skin ailments. Portrays three children as they prepare for bed to show how to wash the hands and face and how to bathe. Through animated drawings describes the structures of the skin and explains why soap is necessary for cleanliness.	Gr. 1 - Gr. 5 - **	No eval. yet
3. Living and Growing ** Churchill-Wexler, 1957; 11 min., color Depicts what it means to "live and grow". As we watch Beano, Wendy, and their pets the narrator explains that they all need food, shelter, and sleep. He points out the difference between things that are alive and those that are not. Correlated with the Heath Elementary Science textbook series.	Gr. 2 - *	Also listed II-A

* Good
** Excellent

II. Living Things - E. (continued)

Name and Description of Film	Other Grade Placements	Remarks
4. Sleep For Health ** EBF, 1950; 11 min., black & white Presents the importance of regular sleeping habits from the viewpoint of a child. Shows the child how a regular bedtime which allows for sufficient sleep helps him attain goals which he himself desires. Emphasizes the child's own responsibility in the formation of good habits. Explains dreaming as a normal part of sleeping. Illustrates how lack of sleep causes irritability and interferes with the enjoyment of everyday living.	Gr. 1 - ** Gr. 5 - **	
5. Uncle Jim's Dairy Farm ** Nat'l Dairy Council, 1948; 11 min., color Daily living on a dairy farm. Shows the adventures of two city children who spend the summer on a farm observing the growth of plants and animals. Discusses the factors affecting the growth and development of the children themselves--food, rest, exercise.		Also listed II-A

* Good
** Excellent

SCIENCE MOTION PICTURE FILMS - Kindergarten

(Deletions)

No. and Name of Film	Page No.	Reason
II. Living Things		
B. How animals are different		
20. The Robin	13	Removed from circulation by AV Dept.

5-9-67

For discussion purposes only

SCIENCE FILMSTRIPS

(35 mm.)

For
Kindergarten

Correlated to the Unit Titles as found in the
Reorganized Science Curriculum

Minneapolis Public Schools
Science Department

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I. The Earth		
C. Water and air around us	1	Pink
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D. Keeping warm...........	5	Yellow

The annotations for filmstrips found on the following pages were obtained from sources such as the Wilson's Filmstrip Guide, producers' catalogs, and the Library of Congress cards.

I. The Earth

C. Water and air around us

Name and Description of Filmstrip	Other Grade Placements	Remarks
1. Air Is Everywhere *		
Jam Handy Organization, 1960; 22 fr., color (First Experiments With Air Series, 5 f.s.) $5.75 each Uses simple experiments to introduce primary-grade children to the scientific method of problem solving. Presents experiments to explain that air is everywhere. Captioned drawings.	Gr. 1 - **	
2. How Does Water Get Into the Air? **		Excellent
Jam Handy Organization, 1955; 30 fr., color (First Experiments About Weather Series, 6 f.s.), $4.75 each Art work illustrations. Johnny wonders where water comes from and how it gets up in the sky. Simple experiments show how water changes into water vapor and evaporates.	Gr. 2 - ** Gr. 3 - * Gr. 5 - *	Slow group or review
3. What Is Wind? *		
Jam Handy Organization, 1955; 31 fr., color (First Experiments About Weather Series, 6 f.s.), $4.75 each Art work illustrations. Through simple experiments with a pinwheel, a balloon and a plastic bag, Tommy discovers that wind is moving air and that air is real.	Gr. 1 - ** Gr. 3 - ** Gr. 5 - **	Slow group or review

* Good
** Excellent

II. Living Things

A. Things that are alive

Name and Description of Filmstrip	Other Grade Placements	Remarks
1. Living Things Need Air * Jam Handy Organization, 1960; 25 fr., color (First Experiments With Air Series, 5 f.s.) $5.75 each Uses simple experiments to introduce primary-grade children to the scientific method of problem solving. Presents experiments to explain that living things need air. Captioned drawings.	Gr. 1 - ** Gr. 3 - **	

* Good
** Excellent

III. Energy

D. Keeping warm

Name and Description of Filmstrip	Other Grade Placements	Remarks
1. Why Is the Night Cooler Than the Day? *		
Jam Handy Organization, 1955; 20 fr., color (First Experiments About Weather Series, 6 f.s.) $4.75 each	Gr. 1 - ** Gr. 3 - ** Gr. 5 - *	
Art work illustrations. Joe wonders why it is warmer in the day than it is in the evening. He uses a thermometer in experiments with the sunshine to learn the answer to his question.		

* Good
** Excellent

JP/gm
1/8/64
Rerun 4/15/66

BASIC SCIENCE SUPPLIES FOR ELEMENTARY SCHOOLS February 1966

Item No.		Unit	Unit Price
32-0140	ALCOHOL, Denatured	quart	.34
17-0100	ALUMINUM FOIL, 15" x 50', to waterproof table tops	roll	.62
17-0110	ALUMINUM FOIL, 18" x 50', for use under an aquarium or terrarium	roll	1.03
28-0100	ANIMAL PEN, 18" x 24" x 18" high	each	6.61
28-0105	ANIMAL PEN, cage, 9" x 9" circular	each	4.55
28-0110	ANT HOME, Turtox 220A167	each	7.50
	AQUARIUMS, TERRARIUMS AND SUPPLIES:		
28-0030	ACID NEUTRALIZER	ounce	.45
28-0040	AERATOR, Saxon	each	6.00
28-0200	AQUARIUM, 3 gallon, seamless	each	6.34
28-0300	AQUARIUM, 6 gallon	each	9.07
28-0340	AQUARIUM CEMENT	lb.	.60
	AQUARIUM COVER (include pattern w/requisition)		
28-0390	9-7/8" x 5-3/4", clear plexiglass	each	.42
28-0400	9-7/8" x 5-3/4", glass, double strength	each	1.00
28-0490	9-1/2" x 17-1/2", clear plexiglass	each	1.27
28-0500	9-1/2" x 17-1/2", glass, double strength	each	1.23
28-0600	AQUARIUM AND TERRARIUM SEALER	tube	.30
28-2100	CHARCOAL, Chunk	5# bag	.43
28-3000	DIP NET, 3" wide, 3-1/2" deep	each	.35
28-3020	DIP TUBE, plastic, 16", no scraper attachment	each	.90
28-3025	AQUARIUM METAL SCRAPER, long handle	each	.60
28-3290	FEEDING RING, 2"	each	.20
47-3260	GLASS SCRAPER, all metal	each	.18
47-0340	BLADES for above scraper	each	.02
28-4160	GRANITE CHIPS	lb.	.034
28-4180	GRAVEL	lb.	.05
28-7460	SAND	lb.	.15
28-8100	SOIL, sterile	bushel	1.50
28-9320	TEMPERATURE CONTROL OUTFIT: Thermostat #340 to include one of the following:	each	5.85
28-4310	PENCIL HEATER, 25 w, for aquarium, 1 to 3 gallon	each	2.00
28-4320	PENCIL HEATER, 50 w, for aquarium, 4 to 6 gallon	each	2.00
28-4330	PENCIL HEATER, 75 w, for aquarium, 7 to 15 gallon	each	2.75
28-0700	ASPIRATOR, Chapman pump, Cenco 13205-3, w/adapters to connect to sink	each	3.25
28-0705	HOSE FOR ASPIRATOR, black (indicate footage needed)	ft.	.27
28-0800	BALANCE, demonstration, clamp and support only (must order meter stick #28-5380 to complete set)	each	2.60

BASIC SCIENCE SUPPLIES FOR ELEMENTARY SCHOOLS

Item No.		Unit	Unit Price
28-0820	BALANCE, TRIPLE BEAM, stainless steel, capacity 610 gms Note: by use of auxiliary weights this balance can be used to a maximum of 2610 gms	each	15.35
28-0825	AUXILIARY WEIGHT SET, for use with Triple Beam Balance. Increases capacity from 610 gms to 2610 gms. Set consists of 2 1,000 gm weights and 1 500 gm weight.	set	4.50
28-0830	WEIGHT, 500 gm, for use with Triple Beam Balance (to replace any lost in Auxiliary Weight Set)	each	1.50
28-0835	WEIGHT, 1,000 gm, for use with Triple Beam Balance (to replace any lost in Auxiliary Weight Set)	each	1.50
28-0840	BALL AND RING	each	4.11
15-1200	BALLOONS, rubber	doz.	.46
28-0900	BAROMETER, ANEROID, 6" diameter, round wooden case	each	3.33
28-2150	BATTERY CELL HOLDER for "D" dry cell, mounted on board with Fahnestock clips for easy connection	each	.50
	BEAKER, Griffin, low form, Pyrex		
28-0940	100 ml	each	.40
28-0960	150 ml	each	.39
28-0980	250 ml	each	.39
28-1000	400 ml	each	.46
28-1020	BEAKER, Griffin, low form, stainless steel, 600 ml	each	2.97
28-1030	BELL, DOOR, electric, D.C., 2-1/2" diameter	each	1.64
28-1060	BELL OUTFIT, electric, dry cell, push button, 1 lb annunciator wire and staples	each	4.12
28-1500	BOTTLES, 4 oz. wide mouth (gas collecting bottle)	doz.	.66
28-1520	BOTTLES, 8 oz. wide mouth (gas collecting bottle)	doz.	.89
28-1540	BOTTLES, 4 oz. (baby food jar type with bakelite screw cap)	doz.	1.61
28-1570	BROM THYMOL BLUE, Crystaline, Free acid form, Harleco #862 (to detect the presence of carbon dioxide -- for the study of the constituents of air and the respiratory activities of plants and animals)	1-gram bottle	1.50
28-1600	BRUSH, Test tube, 3/4" x 3-1/2"	each	.13
28-1620	BURNER, Alcohol lamp, glass, 4 oz.	each	.74
28-1640	BURNER, Turner, liquid petroleum, tank + LP, Bunsen-type	each	7.95
70-4550	REPLACEMENT TANK	each	.98
28-1700	BUZZER, electric	each	1.73

Item No.		Unit	Unit Price
28-2010	CALCIUM HYDROXIDE SOLUTION, limewater (Also see Lime Water Tablets #28-4810)	1# bottle	.60
28-2030	CANDLES, Paraffin	doz.	.48
28-2040	CASTER CUPS, glass	each	.10
28-2050	CAT'S SKIN, half	each	3.64
28-2060	CELL, student's demonstration	each	3.15
28-2110	CHIMNEY, lamp	each	1.00
28-2120	CLAMP, Burette	each	1.20
28-2140	CLAMP, pendulum	each	2.30
28-2160	CLIP, Fahnestock, to be used to mount electrical apparatus (10 in package)	pkg.	.17
28-2200	COMPASS, magnetic, 16 mm diameter	each	.25
28-2240	COMPASS, magnetic, about 45 mm diameter	each	.70
28-2300	COMPOUND BAR, bi-metal	each	.78
28-2400	CONDUCTOMETER, four 5" wires on handle, overall length 13 inches	each	2.05
28-2500	CORKS, assorted, xx quality, sizes 0-11 (100 in bag)	bag	1.35
28-2540	CORK BORER, set of 6, 1/2" largest borer	set	6.20
28-2560	COTTON, absorbent, not sterilized	lb.	.90
28-2600	CULTURE DISHES, Petri, Pyrex, 100 mm x 15 mm	pair	.60
17-3380	CUPS, measuring, Set of 4 (1 C, 1/2 C, 1/3 C, 1/4 C)	set	.36
28-2700	CYLINDER, graduated, Tuttle, short form, 100 ml capacity	each	2.70
28-2720	CYLINDER, hydrometer jar, 275 ml capacity, 13-38" high	each	2.40
28-3015	DISHES, evaporating, Coors 430, 75 mm diameter, 30 mm high, 70 ml capacity	each	.47
28-3040	DISSECTING NEEDLE, wooden handle, bent needle	each	.10
28-3050	DISSECTING NEEDLE, wooden handle, straight needle	each	.07
28-3100	DROPPER, medicine, (12 to pkg)	pkg.	.46
28-3140	DROPPING BOTTLE, 30 ml	each	.35
59-0130	DRY CELL, 1½ volt, #6, diameter 2-1/2", height 6"	each	.64

BASIC SCIENCE SUPPLIES FOR ELEMENTARY SCHOOLS

Item No.		Unit	Unit Price
28-3200	ELECTRIC PLATE, 3 heat, 1000 watt, 110 volt	each	6.14
28-3240	ELECTROMAGNET, horseshoe type	each	11.40
28-3260	ELECTROSCOPE, flask form, 250 ml, Pyrex Erlenmeyer flask	each	2.85
28-3280	ETHYL ACETATE, for killing insects	lb.	1.26
28-3300	FEHLING'S SOLUTION, A	16 oz bottle	1.20
28-3320	FEHLING'S SOLUTION, B	16 oz bottle	1.55
28-3400	FILE, Triangular, 4"	each	.38
28-3500	FILTER PAPER, qualitative, 100 circles per package, 11 cm diameter	pkg.	.44
28-3600	FLASK, Erlenmeyer, narrow mouth, Pyrex, 250 ml	each	.48
28-3620	FLASK, Erlenmeyer, narrow mouth, Pyrex, 500 ml	each	.61
28-3800	FUNNEL, plastic, 73 mm, or 2-7/8" top diameter	each	1.14
28-4000	FUNNEL, Pyrex, 65 mm or 2-1/2" top diameter	each	.75
28-4100	FUNNEL, thistle top, 30 cm or 12" length, 35 mm or 1-1/4" diameter	each	.36
	GLOVES, rubber:		
28-4120	size 8	pair	.80
28-4130	size 9	pair	.80
28-4140	size 10	pair	.80
28-4200	GYROSCOPE, simple form, 5.5 cm diameter, support and starting cord	each	1.25
28-4360	HYDROCHLORIC ACID (HCL)	lb.	1.03
28-4400	HYGROMETER, Humidiguide, direct reading	each	9.00
28-4500	IRON FILINGS	1# carton	.38
28-4600	JAR, battery, cylindrical, 1 gallon	each	1.42
28-4800	LAMP, incandescent, miniature, 2-1/2 volt maximum, screw base	each	.25
28-4805	LENSES, demonstration set, 3.75 cm diameter, 6 in set	each	5.25
28-4810	LIME WATER TABLETS (See Calcium Hydroxide Solution, #28-2010)	each	.0075
28-4820	LITMUS PAPER, blue, 100 strips in vial	vial	.09
28-4840	LITMUS PAPER, neutral, 100 strips in vial	vial	.09
28-4860	LITMUS PAPER, red, 100 strips in vial	vial	.09

Item No.		Unit	Unit Price
28-4940	MAGNETS, bar, steel, 2 in box with keepers	set	1.80
28-5100	MAGNETS, ceramic cylinders, 3/8" x 1/8", #1054	each	.03
28-5000	MAGNETS, ceramic cylinders, .52" x .25", #866	each	.03
28-5140	MAGNETS, "floating"	each	3.25
28-5200	MAGNETS, horseshoe, 2.8 cm	each	.60
28-5240	MAGNETS, horseshoe, 4 cm	each	2.20
28-5250	MAGNETS, natural, lodestone	each	.22
28-5260	MAGNETIC NEEDLE, on stand	each	2.45
28-7100	MAGNIFIER, round, 3" diameter reading glass with handle, 2x to 3x	each	1.25
28-5300	MAGNIFIER, small, premium plastic, 3-5/8" long, fitted with two spherical convex lens (3x and 7x) and two cylindrical magnifiers	each	.31
28-5280	MAGNIFIER, tripod, 10x	each	1.10
28-5320	MAT, asbestos, 10" x 16"	each	.65
28-5340	MAT, wire gauze, asbestos center, 4 inch	each	.21
28-5380	METER STICK, maple, metric and English scales	each	.85
28-5400	MICROSCOPE, ELECTRIC, including: 50X and 100X objectives, 12 prepared slides, micromount cards, one 32 page booklet, "The Microscope in Elementary Science", and wood case	each	18.18
18-4600	ELECTRIC LIGHT BULB, 6 watt, 115 volt, candelabra bayonet base (replacement bulb for item #28-5400)	each	.18
28-5410	MICROSCOPE, model ESM, 100X Bausch and Lomb (No Sub) Cat. 31-33-03 (Price includes illuminator, item #28-5425)	each	15.00
28-5420	MICROSCOPE, ZOOMSCOPE, Model STZ 100 Bausch and Lomb (No Sub) Cat. 31-21-03 Magnification 25x through 100 x Zoom. (Price includes illuminator, item #28-5425)	each	53.00
28-5425	ILLUMINATOR, portable, Bausch and Lomb (No Sub) Cat. 31-33-03 Rite-Lite	each	3.00
28-5426	LAMP, replacement for microscope illuminator (Rite-Lite) Item #28-5425, 9-3/4 watt, candelabra, screw base, Bausch and Lomb, (No Sub) Cat. 31-31-40	each	.15
28-5500	MICROSCOPE SLIDES, culture	each	.12
28-5600	MICROSCOPE SLIDES, plain, 72 per box	box	1.10
28-5700	MIRROR, concave and convex, 75 cm diameter, 20 cm focus	each	1.00
28-5740	MIRROR, plane, square, 10 cm x 10 cm	each	.20
28-5800	MORTAR AND PESTLE, porcelain, Coors 522, 100 mm diameter, 60 mm high, 115 mm pestle length	set	1.66
28-5840	MOTOR, St. Louis, with 2 bar magnets; electromagnet attachment, $6.15	each	13.50

BASIC SCIENCE SUPPLIES FOR ELEMENTARY SCHOOLS

Item No.		Unit	Unit Price
28-5860	NEEDLES, DARNING, 10 in pkg.	pkg.	.25
28-5880	NEEDLES, KNITTING, 12 in pkg.	pkg.	.55
28-5900	PAN, Dissecting, 12" x 7-1/2" x 5/8" deep	each	1.20
28-5910	PAN, METAL, vitreous enamel, 16-3/8" x 10" x 2-1/8"	each	2.50
28-5920	PAN, METAL, vitreous enamel, 20-1/2" x 12-3/4" x 2-3/8"	each	3.64
28-5930	PAPER, BLUEPRINT, 5 x 7, 24 sheets	pkg.	.49
28-5940	PAPER, BLUEPRINT, 8 x 10, 24 sheets	pkg.	1.29
28-5960	PINS, SILK, #2, for mounting insects (100 per pkg.)	pkg.	.43
28-5980	PITH BALLS, 12	pkg.	.80
28-6100	PLANT FOOD, "Plantabbs", 100 in pkg.	pkg.	.20
28-6000	PLANETARIUM, Universal, shows day and night, seasons, length of day, phases of moon, earth-sun-moon phases, includes manual	each	24.00
28-6200	PLATES, glass, flat, 12 to pkg. 2" x 2" x 1/16" thick	pkg.	.30
28-6220	POTS, FLOWER, unglazed earthenware, 4" diameter	each	.10
28-6240	PRISM, equilateral, flint glass, 75 mm long	each	2.00
28-6300	PULLEY, double, Bakelite	each	1.15
28-6340	PULLEY, single, Bakelite	each	.80
28-6400	PULLEY, double tandem, Bakelite	each	1.55
28-6440	PULLEY, triple tandem, Bakelite	each	2.05
28-6500	PUMP, model, plastic, force	each	5.65
28-6540	PUMP, model plastic, lift	each	4.95
28-7000	RADIOMETER	each	.80
28-7140	RECEPTACLE, screw base, for incandescent lamp, miniature, item #28-4800 (unmounted)	each	.25
28-7145	RECEPTACLE, screw base, for incandescent lamp, miniature, (mounted on board with Fahnestock clips for easy connection) -- 2 lamps included	each	.94
28-7020	RAIN GAUGE, wedge shape	each	3.95
28-7300	ROD, FRICTION, glass, 300 mm x 13 mm	each	1.10
28-7340	ROD, FRICTION, hard rubber, 250 mm x 13 mm	each	.70
28-7360	ROD, soft iron (used as electromagnet core)	each	.25
28-7400	RUBBER STOPPERS, assorted sizes, 00-8 (solid, one-hole and two-hole)	2 lb.	2.40

Item No.		Unit	Unit Price
17-5800	SALT SHAKER, glass, for iron filings	each	.08
28-7480	SCALE, balance, spring dial type, 250 gms or 9 oz. capacity, Cenco 5410 - or equal, (to determine the weight of objects weighing less than one-half pound and small forces)	each	2.25
28-7490	SCALE, balance, spring, dial type, 500 gms or 18 oz. capacity, Cenco 5510 - or equal, (to determine the weight of objects weighing one pound or less and to measure small forces)	each	2.25
28-7500	SCALE, balance, spring, dial type, 2,000 gms or 72 oz. capacity	each	2.25
28-8000	SCIENCE KIT AND MANUAL, contains almost all necessary initial equipment for elementary science	each	42.00
28-8040	SILK PAD, exciting	each	.55
28-8200	SPOON, DEFLAGRATING, iron, 3/4" diameter cup, total length 15"	each	.26
28-8300	SUPPORT, iron, rectangular base, 4-7/8" x 8", w/rod	each	1.90
	SUPPORT, ring with clamp		
28-8400	2-1/2" inside diameter	each	.95
28-8500	3-3/8" inside diameter	each	1.05
28-8520	SWITCH, KNIFE (unmounted) single pole, single throw	each	.40
28-8525	SWITCH, KNIFE (mounted on board with Fahnestock clips for easy connection) single pole, single throw	each	1.13
59-0570	SWITCH, PUSH BUTTON (unmounted)	each	.50
28-8530	SWITCH, PUSH BUTTON (mounted on board with Fahnestock clips for easy connection)	each	1.08
28-8600	TELEPHONE RECEIVER	each	5.00
28-8640	TELEPHONE TRANSMITTER	each	4.00
28-8700	TEST TUBES, Pyrex, 6" x 5/8"	each	.0508
28-8740	TEST TUBE CLAMP (Holder)	each	.11
28-8800	TEST TUBE RACK, wood, 6 holes and 6 pins	each	.70
28-9000	THERMOMETER, Celsius, (Centigrade) laboratory type, (-10°C to 110°C)	each	1.80
28-9005	THERMOMETER, Celsius, (Centigrade) student type, (-30°C to 50°C) inexpensive thermometer mounted on plastic backing	each	.15
28-9040	THERMOMETER, Fahrenheit, laboratory type, (0°F to 230°F)	each	1.40
28-9050	THERMOMETER, Fahrenheit, student type	each	.15
28-9100	THERMOMETER, metal, protected bulb, white enamel, scale in black	each	1,08
28-9200	THERMOMETER, outdoor, metal, protected bulb, mounting brackets, swivel type	each	1.53
28-9300	THERMOMETER, wooden back, natural finish	each	1.20

Item No.		Unit	Unit Price
16-3420	THREAD, black No. 50	spool	.09
16-3520	THREAD, white No. 50	spool	.09
28-9340	TONGS, beaker, Fisher improved	pair	6.50
28-9360	TONGS, crucible, Parkerized steel	pair	.38
	TOOLS:		
32-4740	HAMMER, claw, 10 oz. head	each	2.24
28-4300	HAMMER, geologist, 22 oz. head	each	5.50
32-6300	PLIERS, combination, adjustable, 6"	each	.50
32-7460	SAW, HACK, adjustable	each	1.18
32-0930	BLADE, HACKSAW, 12", 14 teeth	each	.10
32-7550	SCREWDRIVER, 4" blade, Stanley #20	each	.71
32-8750	SHEARS, tinners snips, 3" cutting length, Wiss #9	pair	2.29
28-9400	TUBING, GLASS, lead-potash, 6 mm outside diameter	lb.	.55
28-9420	TUBING, RUBBER, 3/16", black	ft.	.27
28-9440	TUBING, RUBBER, 3/16", red	ft.	.27
	TUNING FORK, unmounted		
28-9500	128 vps	each	5.50
28-9520	256 vps	each	5.50
28-9540	320 vps	each	5.15
28-9560	384 vps	each	5.15
28-9580	512 vps	each	5.00
15-9200	TWEEZER, length - 4-5/8"	each	.31
12-8600	VERMICULITE	5# bag	.20
28-9600	VOLT-AMMETER, pocket type, DC, range 0-10 volts, 0-35 amperes	each	3.60
28-9640	WATCH GLASS, Pyrex, 75 mm diameter	each	.15
28-9700	WEATHER VANE, with base, metal, directions plainly marked	each	.83
28-9720	WEIGHTS, BALANCE, AVOIRDUPOIS, iron, class T, 1/2 oz. to 1 lb. (set of 8)	set	5.00
28-9740	WEIGHTS, METRIC, HOOKED, 10 gm - 1 kgm	set	14.25
28-9750	WEIGHTS, BALANCE, METRIC, in wood block, 1 gm - 500 gm	set	8.25
28-9770	WIRE, copper, annunciator, #22, vinylite covered	1# coil	2.34
28-9780	WIRE, iron, 17 gauge	4 oz spool	.34
28-9800	WOOD SPLINTS, 500	pkg.	.63

BASIC SCIENCE SUPPLIES FOR ELEMENTARY SCHOOLS

Item No.		Unit	Unit Price
	BIRD CARDS, Audubon, postal card size, 50:		
28-1100	Summer	box	1.20
28-1200	Winter	box	1.60
28-1300	Spring	box	1.60
28-1400	BIRD CHARTS, Audubon, 20" x 30", set of 4: Winter, Summer, Game Birds, and Birds of Prey	set	3.55
28-7200	ROCK CYCLE CHART	each	10.95
	ROCK COLLECTION:		
28-7210	KINDERGARTEN, 5 specimens to illustrate the Kindergarten concepts, each 3" x 3" x 2" (unmounted)	set	1.40
28-7220	GRADE ONE, 9 specimens to illustrate the First Grade concepts, each 3" x 3" x 2" (unmounted)	set	1.40
28-7230	GRADE FOUR, 9 specimens to illustrate the Fourth Grade concepts, each 3" x 3" x 2" (unmounted)	set	1.40

(Schools may purchase emergency supplies directly, paying for same out of the school building's funds. Principals are requested to accumulate receipts of at least five dollars ($5.00) and then make a general requisition (form G1000) to cover the items purchased. Attach all receipts and send the requisition to the Finance Department for reimbursement from the individual school's supply allotment.)

1a
1/27/66